Vol. 2 TECHNOLOGY DEPARTMENT SEPTEMBER, 1920 First Copy No. 6

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

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Our best and whitest South Carolina clay shipped pulverized, or cracked down to small lumps.

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A white pulverized clay from our mine in Virginia.

Dried to a moisture content of about 3 per cent.

Suitable for coating book paper and filling book paper.

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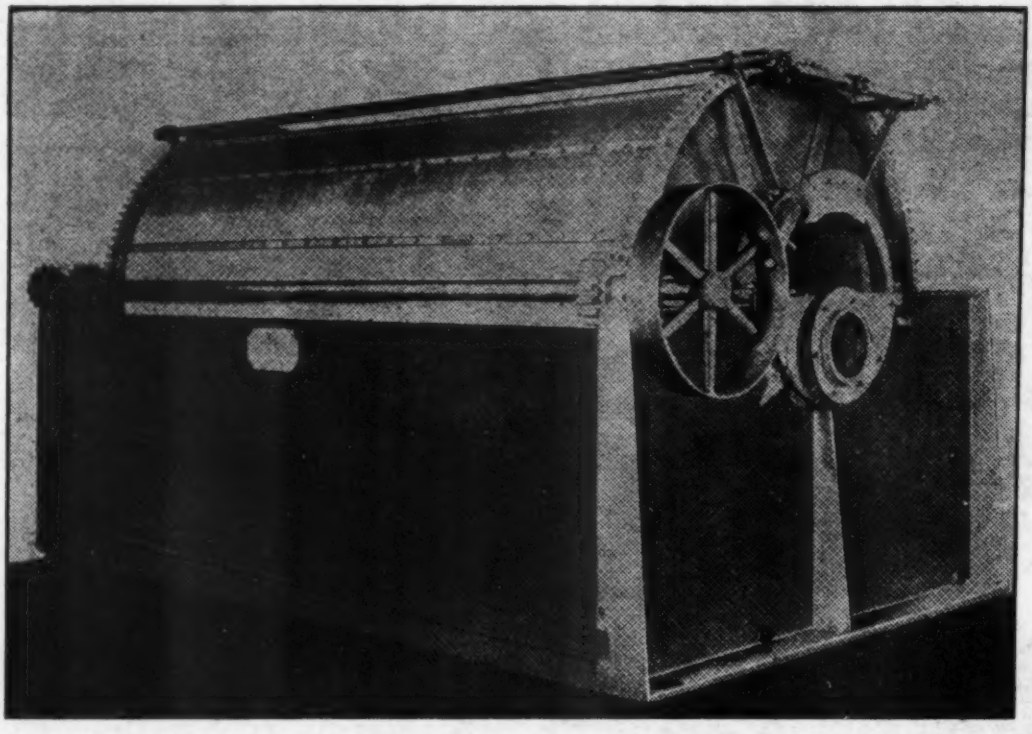
The North Machine



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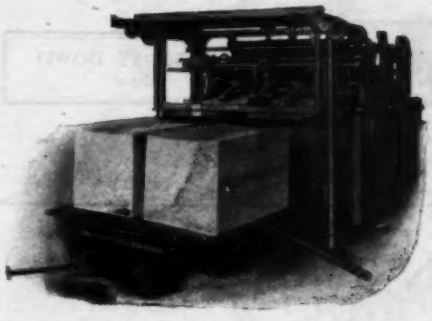
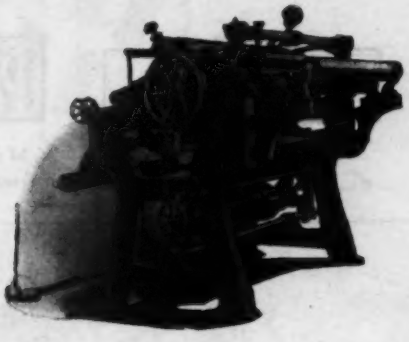
We Slush or Thicken Your Pulp with Three Sizes of the North Pulp Thickener

Father Took Us Out of School Because It Interfered with Our Education. That's Why We Are Machinists and Molders.

The Green Bay Foundry and Machine Works

of GREEN BAY, WISCONSIN





FOR THE FINISHING ROOM AND ON PAPER MACHINE

"MOORE & WHITE"

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REPRESENTING THE EXCEPTIONAL IN SERVICE, SATISFACTION AND ECONOMY

They Increase Production

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ESTABLISHED 1884

NORTH PHILADELPHIA STATION
PHILADELPHIA, U. S. A.

Builders of Paper Machinery—Friction Clutches—Speed Changes

Vol. 2—No. 6

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of The Paper Industry

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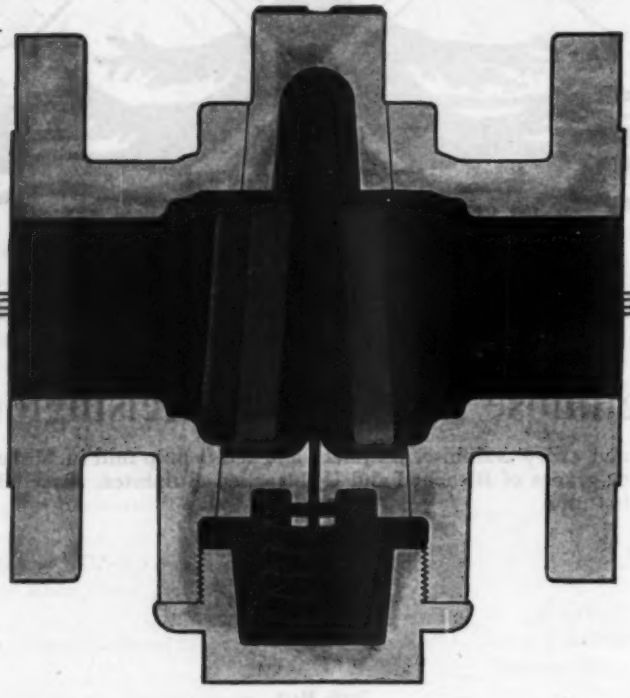
Blow-off Cocks

with compensating spring complies with A.S.M.E. Boiler Code.



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Resinous woods such as Jack pine, may now be used successfully in the manufacture of pulp. Zaremba Company has overcome the obstacle which has long stood in the way—the loss of liquor from severe foaming.

This has been accomplished with the Hughes Foam Arrester, designed by Zaremba engineers, and furnished with all Zaremba soda pulp installations.

Zaremba Evaporators the Choice of the Pulp Industry

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From folders to broadsides and from phantom weights to bristols as heavy as lumber, your every need is covered, as well as papers for every process of reproduction that will reproduce merchandise, products, or service, in a manner second only to the original.

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"For every printing need"

SATISFACTION PRICE CO-OPERATION

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Chicago

A Survey That Costs You Nothing and May Greatly Increase Production

HOW much time do trips to the oil room cost the men in your shops? How often do machine tools stand idle for the same cause? How much oil is lost because of waste through drippage and evaporation from oil barrels? What does the annual waste from your oil storage system amount to?

Cut No. 364 For oil or gas

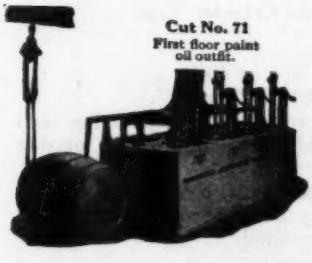
Why not get the facts? Call on Wayne engineers. They are the most competent counsellors you can command in the oil storage field. They will go over your shops with you. Their services are yours gratis, without obligation. Their report to you will be absolutely fair. They may recommend the proper Wayne Oil Storage System for you and submit plans for your approval—but not unless you need it.

Cut No. 227 Portable tank for lubricating oil.

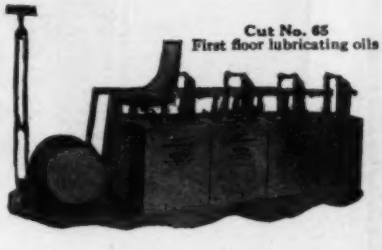
You will not be bothered with salesmen. The survey will cost you nothing and may mean greatly increased production and the elimination of useless time, labor, and oil lost.

Call on Wayne engineers for a consultation today. When writing ask for bulletins Nos. 364PI, 71PI, 227PI and 65PI.

Cut No. 71 First floor paint oil outfit.



Cut No. 65 First floor lubricating oils



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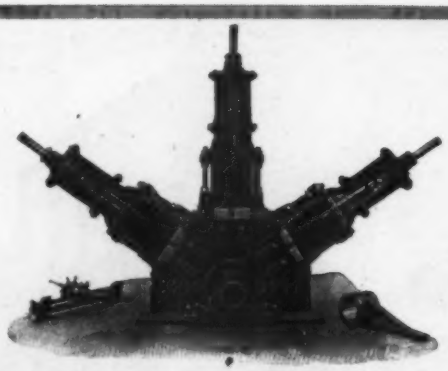
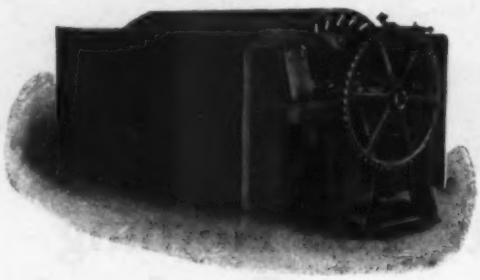


Standard Wood Pulp Grinder

Built in Three Sizes

Taking wood 24″, 30″ or 32″.
Bridge-trees—Are well proportioned.
Flanges—Made of steel, 40″ diameter.
Hydraulic Cylinders—Copper lined, 12″, 14″ or 16″ diameter.
Pillow Blocks—22″ length of bearing.
Pockets—Very heavy and designed particularly for free discharge of pulp.
Service—Continuous distinctive service is always assured.



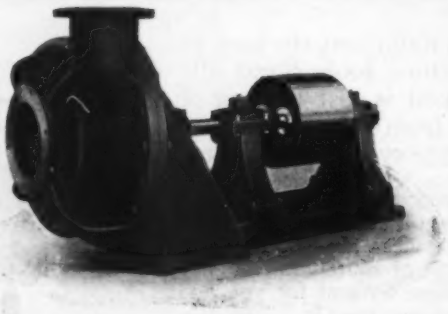
The Wood's Machine

Used as Pulp Thickeners, Savealls, Pulp Washers and Water Filters

ADVANTAGES:

Reduced Wire Costs	No Couch Roll
Enormous Capacity	Minimum Repairs
Only 2 H. P. Required	No Doctor
Works Automatically	Requires No Attention

TWENTY-THREE SOLD DURING THE PAST YEAR



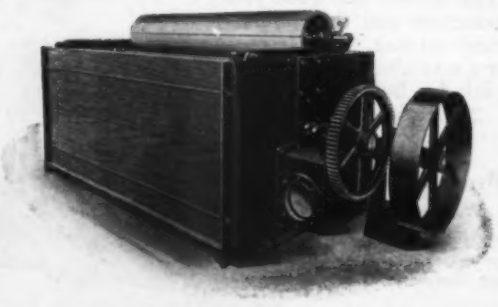
Heavy Duty Paper Mill Pumps

Built Especially for Handling Stock

Impeller—Extra wide, enclosed type and perfectly balanced against vibration and end thrust.

Suction Inlet—Is of large area, giving a free and easy entrance to same.

Our Pumps are economical in use, simple in construction, of very great durability and discharge continuous steady stream.



Improved Decker

Single or Double Cylinder Type

Built in the following sizes:
Cylinder mould diameter, 36″ or 40″.
Face of cylinder mould, 72″, 84″ or 96″.
Cylinder mould of best reinforced construction and properly supported with our latest design outside bearings.
Vat furnished either all wood or with cast iron ends.
For Stability and Efficiency our Improved Deckers are Unexcelled

PULP AND PAPER MILL MACHINERY
GLENS FALLS MACHINE WORKS
GLENS FALLS, NEW YORK

PLANT OF NORTHWEST PAPER COMPANY, CLOQUET, MINN., EQUIPPED WITH SIROCCO PRODUCTS

What Is "ABC" Equipment Doing for Present-Day Paper Mills?

MODERN, scientific methods for ventilating, heating and air-conditioning have assisted greatly in increasing the productive power in paper mills, some of the chief benefits being—

(1) ***Assisting materially in increasing production through improved methods of drying.***

(2) ***Assisting in meeting labor problems through improvement of conditions under which workers labor in the mills.***

(3) ***Assisting in improvement of quality of production through scientific treatment of atmospheric conditions under which the product is obtained.***

(4) ***Assisting in the more economical maintenance and operation of the mills.***

A brief survey of how "A B C" Equipment, as applied to paper mills, is rendering this vital service, is given in our Bulletin "A B C Equipment for Paper Mills." Would you like a copy?

AMERICAN BLOWER COMPANY
DETROIT, MICHIGAN

"National" Dyes are National Assets

¶ The progress of the American dyestuff industry will be effectively shown by the exhibit of the National Aniline & Chemical Company, Inc., at the Sixth National Exposition of Chemical Industries, to be held at the Grand Central Palace, New York, during the week of September 20th.

¶ From the crude and basic raw materials through the intervening stages of intermediates, the finished dyestuffs, to the actual utilization of the resulting colors in American daily life, and in the home, the steps of this progression will be indicated in a panorama of absorbing interest.

¶ A cordial invitation to visit this exhibit is extended to all those interested in seeing for themselves the development in 1920 of this vital and pivotal industry.

National Aniline and Chemical Co. Inc.

General Offices—21 Burling Slip, New York

Quality

EDITORIAL

The Great Safety Movement

"PRODUCTION without safety is inefficient. Accident prevention is absolutely an essential part of the industrial program." These words of Henry Ford, organizer and president of the Ford Motor Company, are expressive of the value with which this comparatively new but important science is regarded by a fast growing number of the great industries of America.

It is not a presumptuous statement to make that all men believe in safety; but do they practice it? "The first law of nature," we have been taught, "is self preservation."

For the reason that so many people forget this fundamental law, however, and carelessly allow themselves to become oblivious to danger, resulting in deaths amounting to approximately twenty-two thousand in the industries alone every year, the necessity has become apparent to reduce this great loss of life and its accompanying loss in production by rendering it impossible so far as machinery can be designed for one to be exposed to injury or death.

As evidence of the manner in which the paper and pulp mills of the United States and Canada are concentrating a large part of their efforts upon human conservation, one hundred and forty-four mills, employing thousands of men in their plants have to date become enthusiastic members of the National Safety Council. This does not mean anything, however, if the doctrines of safety are not zealously applied.

The severity rate, as shown by the National Safety Council accident records of nearly fifty mills who reported for the first six months of 1920, averaged a little over three days lost in every one thousand hours worked. Basing this on an average working day of eight hours, the result shows an average loss in production amounting actually to two and one-half percent. Added to this was the time lost by the retarding effects that these accidents produced on the efforts of the other employes.

Many mills have a severity rate much below one-half of one percent, while others are much higher, where a death or permanent injury has occurred; but the indications are that a rate of one-half of one percent is practical and could be maintained by reducing minor accidents and preventing deaths and permanent injuries.

What is necessary to accomplish this result?

Machine guards every place where danger lurks—to make them foolproof and so far as possible accident proof; well lighted buildings with every dangerous place carefully guarded; and above all—cleanliness.

With these things provided, employes obtain the habit of becoming unconsciously careful, and further than this, they are then more willing to do their share and respond to the educational efforts which are equally as necessary in perfecting a safety organization.

The educational program should consist of regular meetings held frequently for the purpose of discussing the topics of safety and production; the distribution of educational literature, and posting in a conspicuous place the latest safety bulletins.

"Loyalty to the institution!" must be the slogan of the employes. They should ever be alert to avoid accidents, not only for their own personal safety, but that the institution might be benefited from the returns of their uninterrupted labor.

New Rewinder for Finishing Room

Camachine Universal Type 10—Model 10 A

Sums up all labor and waste saving features of previous models and adds valuable new features for quick, accurate production of "Midget" to "Jumbo" Rolls.

Ideal Machine for Paper Dealers and Paper Goods Manufacturers

This new Slitting and Rewinding Machine is offered subject to the approval of users after thirty days' free trial in their plant anywhere in the United States within one thousand miles of our shop.

Sizes 42" to 82" Width

CAMERON MACHINE COMPANY

Patentees and Builders

Poplar Street **BROOKLYN, N. Y.**

Selecting the portions of fleece best suited for felts and jackets.

The First Step in the Preparation of Wool for Paper Makers' Felts and Jackets

NOT only does climate, grazing and breed of animal affect the quality of wool from a given country or locality, but the health, age and part of the sheep from which the wool is clipped affects the quality of the fibres in each individual fleece.

Very definite qualities are required in the wool used for paper makers' felts and jackets. Your satisfaction, and in a measure your profits, depend upon the care with which we sort the raw material.

The selection from each fleece of only those fibres which contain the qualities so essential for the paper makers' use is the first step in the service which F. C. Huyck & Sons have rendered through their Felts and Jackets during the past half century.

The distinguishing mark of Kenwood Felts.

F. C. HUYCK & SONS
Albany, N. Y.
FELTS AND JACKETS

To Our Customers and Friends:

In these times of stress when it seems impossible to fill orders as quickly as you would sometimes wish, we want you all to know that every effort is being made to serve you to the best of our ability, and that every ounce of our strength is being exerted with that thought in view—namely, to serve—so that you may always have on hand sufficient of the wires that are noted for their long runs, and which always make good our claim that

"Appleton Wires are Good Wires"

APPLETON WIRE WORKS
Appleton, Wis.

Cramped for floor Space in Your Beater Room?

Here's a profitable way to not only make your present floor space go twice as far—but at the same time reduce your power consumption 50%—*a still keep up production.*

Install a Bird Continuous Beater Attachment

It pays for itself six times over the first year. Keeps stock uniform. Saves time and labor. Removes strings and rags from board stock. Together with one ordinary beater it accomplishes as much work as two beaters. It is a simple, practical and effective device, designed to be attached to any ordinary tub.

Let us send you our "Continuous Beating Catalog F."

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EAST WALPOLE, MASS.

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Continuous Beating

BB-118

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Largest China Clay Producers in the World

500,000 Tons Annually

ECCO CLAYS TRADE MARK

$300.00 for an Article

THE PAPER INDUSTRY was started with the one idea of being helpful to the whole Pulp and Paper Manufacturing Industry. We believe we have succeeded. At least many people tell us so, but we want to do more in being helpful, so that every man in the industry may know more of his chosen work.

Many men in this industry have valuable ideas that would be worth hundreds, possibly thousands of dollars; for other men to know, and at the same time will not harm the one man that knows it. The old idea of hiding our light under a bushel for fear someone else will learn of something that we may know has passed, and the war was to a large degree responsible for this. It is stated that America advanced more in most of the arts and sciences, as well as manufacturing processes, in the few years of the war period, than it had in fifty years before.

We lose nothing by giving out knowledge. If each of two men have a dollar and each gives his to the other, both will have the same and gain nothing, but if each of two men have an idea, and each gives away that which he has, he does not lose, but each has two, and so if we multiply this by one hundred or a thousand, each man that formerly had only one idea, now has a hundred or thousand, and no one has lost.

So, in order that the greatest number may have the greatest amount of knowledge, and in order to get men to take the time for the proper study and preparation of the right kind of an article, we will give the sum of $1,000 as remuneration to those who will endeavor to furnish us with real helpful articles, during the next twelve months, divided up as follows:

For the best article furnished in this competition, we will give the sum of $300.00.
For the second best article we will pay $100.00.
For the third best article we will pay $50.00.
For the fourth best article we will pay $25.00.
For the fifth best article we will pay $15.00.
For the next thirty-one best articles, we will pay $10.00.
For the next forty best articles we will pay $5.00.

The only proviso there is in this propsition is that we receive at least seventy-six articles that we can use in the competition during the twelve months beginning October 1, 1920. Any one man may write as many articles as he desires, providing they are on different subjects. Each article, however, should fill at least three pages of THE PAPER INDUSTRY.

In the event that seventy-six articles should fail to be written or accepted, we will then pay the $300.00 for the best article that is furnished, $10.00 each for the next twelve best articles, and $5.00 each for all remaining articles we accept.

Several well known men of the industry will be chosen as judges in this competition, their names to be announced at a later date, and the publisher of THE PAPER INDUSTRY will only decide first whether the article is worthy of publishing at all, and if so, then it will take its chance for the $300.00 prize.

In order to make it possible to publish these papers during the next twelve months, papers must begin to come in immediately and the minimum price of $5.00 will be paid for each as they are published, the balance representing the prize money will be awarded after the twelve months period has expired, and the decisions have been made.

Some men feel that they know many good things, but cannot write them down in proper fashion. It will not be necessary that these articles be written to show any great amount of learning, as many men who have had little schooling may be able to furnish the most helpful ideas, and it is something that is helpful that we want; we have an editor for the very purpose of carefully scrutinizing everything before it goes to the printer, so that it may be grammatically and typographically correct.

You can choose your own subject, as there are so many things to be written about in this great industry that we will not even attempt to outline the full list of subjects, but it may be of some plan to get a larger product out of a machine; it may be on the subject of saving in the power plant; saving bleach, dye, or one of many other things; it may be a plan to make the wire or felt last longer; some method of making a better sheet without increasing the cost, or making as good a sheet by reducing the cost; a new idea in the process of pulp making; in fact it can be on any subject that will be helpful to pulp and paper manufacturers, and their employes.

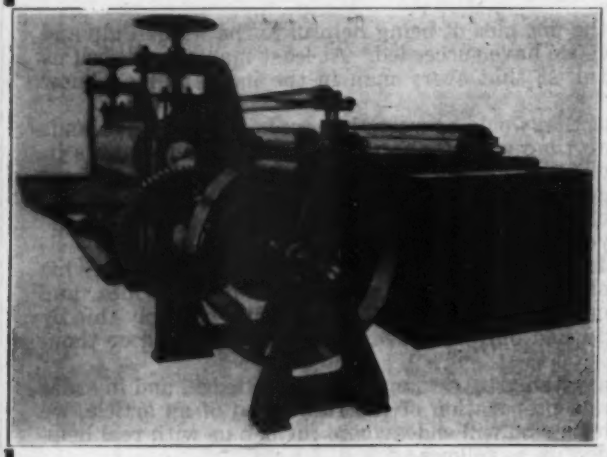
Anyone can try his hand, be he president, manager, superintendent, chemist, engineer, machinery man, foreman, or workman. If some one should feel they cannot write a long article, then write a short one. We will pay for it, if we can use it.

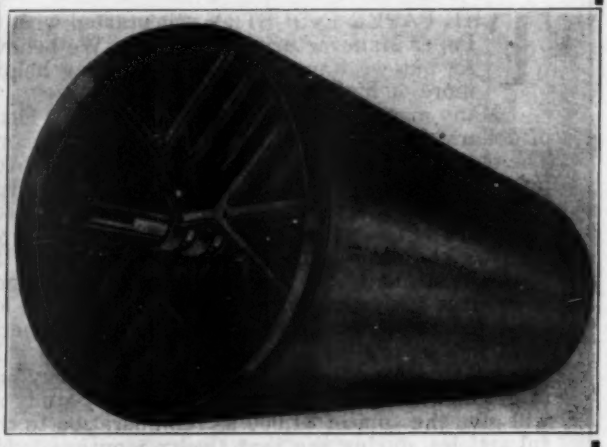
Start NOW and get your article or articles in at the earliest possible time.

Address all articles in this competition to

"Contest",
THE PAPER INDUSTRY,
356 Monadnock Block,
Chicago, Ill.

Pulp and Paper Mill Machinery





We manufacture

Wet Machines

that give satisfaction

Single Cylinder—Double Cylinder

Any width face or diameter mould.

We also make a combination wet machine and decker.

Particulars on Request

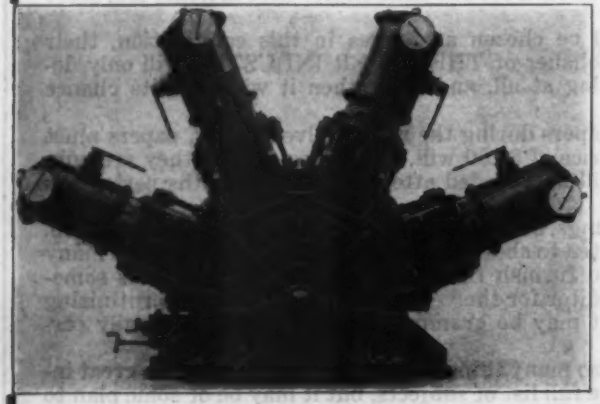
Cylinder Moulds

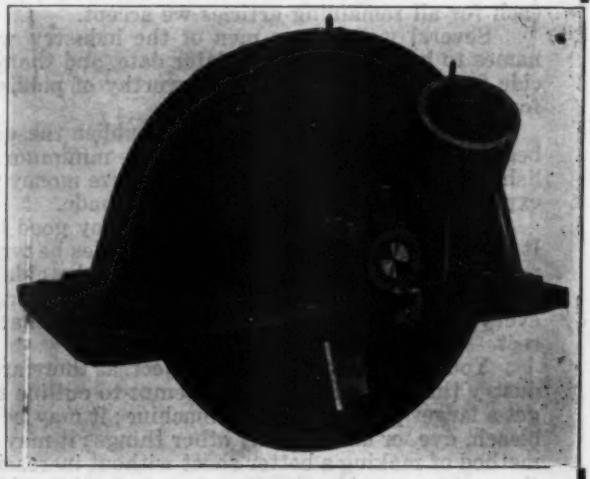
Made on our special machinery—will stand long wear.

Hand sewed covers—Removable end Clamping Rings give a smooth surface, therefore a longer life to your felt.

Satisfaction Guaranteed

We also manufacture the "WOLF (Patented) MOULD."





Grinders

Three and Four Pockets

Equipped with **all Latest Devices** including our **Patented Pulp Scraper between the pockets.**

Inquiries Solicited

We also manufacture Barkers, Pumps, Iron, Brass, Bronze and Lead Castings

Chippers

That produce clean, evenly cut chips, free from slivers. Our patented improvements make this possible.

Made in
48″, 84″, 90″ Sizes
Right or Left Hand—Three or Four Knives

Description on Request

UNION IRON WORKS

Bangor, Maine

Another New Link-Belt Data Book

Enables you to select Roller Chain Drives for Industrial Drives,—Tractor and Truck Drives

FOR years the power transmission engineer had his Link-Belt Silent Chain Data Book, which enabled him to select the correct silent chain drive for his purpose and figure its cost. This is the recognized authority on silent chain drive practice.

And now comes this new hand-book of roller chain practice. It shows how to figure drives, determine prices, gives information on care and upkeep, and a wealth of other information on this whole subject which will prove invaluable to the engineer and others interested in roller chain.

The subject of wheels is also gone into very thoroughly. (The chain is the standard and the wheels must be made to fit it, to assure their working together properly.)

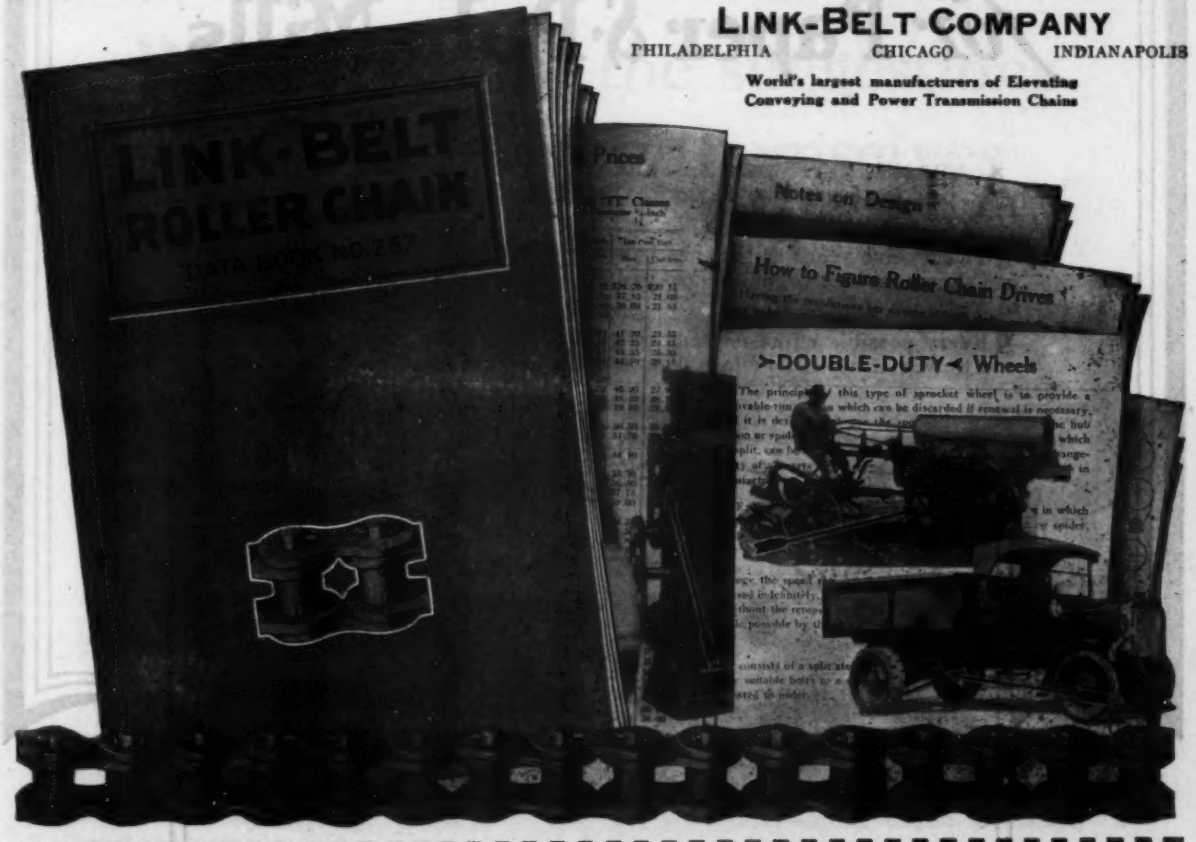
In short it is a complete handbook of roller chain application and design. It is not merely a catalog.

Send for it today. Use the coupon.

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

World's largest manufacturers of Elevating Conveying and Power Transmission Chains



Link-Belt Company, 910 S. Michigan Ave., Chicago, Ill.

Please send me a copy of your New Roller Chain Data Book No. 257.

*Name*_____ *Firm*_____

*Address*_____ *Town and State*_____

"ALBANY" Felts *and* Jackets *for* Paper & Pulp Mills

ALBANY FELTS are adapted for every type of Paper and Pulp Machine, and for every kind of stock. Every one is made of Pure Wool of the very best quality.

¶ Twenty-five years' experience in making Paper Makers Felts and Jackets has shown us how to make them as best suited to the needs of various kinds of machines and stock.

¶ Every possible effort is made to give our customers the best satisfaction and to weave into our Felts and Jackets the longest possible life.

ALBANY FELT CO.
ALBANY — NEW YORK

Working from the suggestions of the mill men themselves

How the world's largest manufacturer of fine papers eliminates loose manufacturing methods by investigating the suggestions of its men

ANY man who has had several years' experience in a paper mill is a man whose advice on paper-making is worth having. A belief in this fundamental fact is one of the guiding principles of the American Writing Paper Company.

Big results oftentimes spring from chance ideas. The American Writing Paper Company realizes this and has established its Scientific Research Laboratory to follow out the ideas and suggestions of mill men and mill superintendents in the making of paper.

In this sense the Laboratory is a service organization for the men in the mills. The great work it has accomplished in taking loose methods out of the making of paper and in standardizing the finished paper, has been done largely as the result of following out the "leads" of these men.

This means that a high degree of efficiency prevails in every one of the 26 mills, and as a result every man contributes directly to the Company's success.

By standardizing the papers manufactured, on the other hand, the Laboratory makes it possible to have a more all-year-round production.

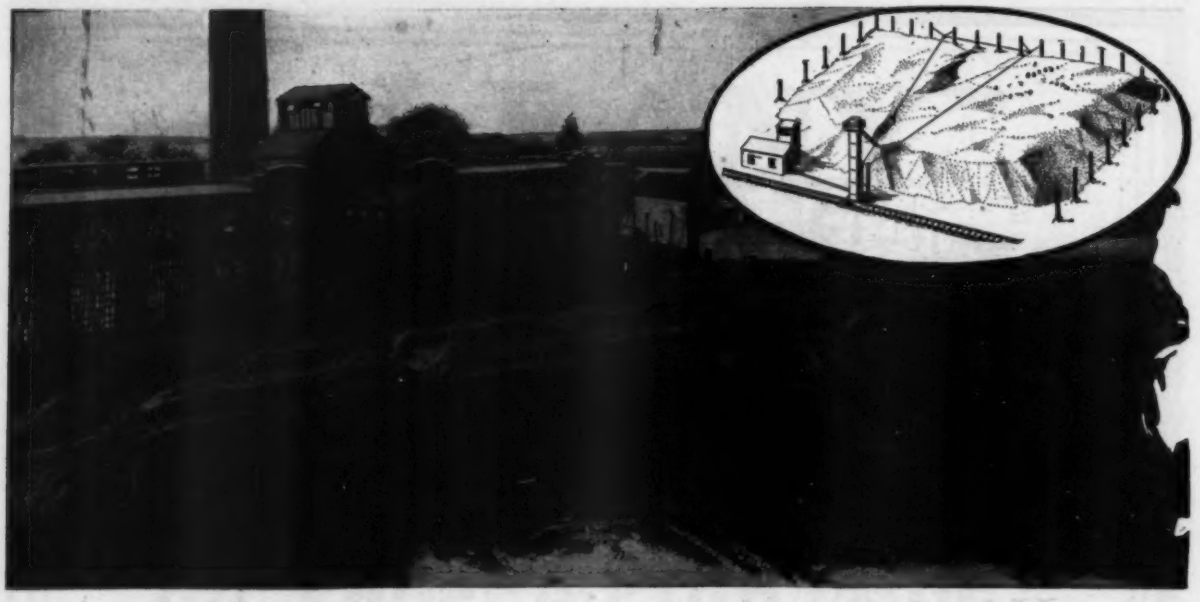
The American Writing Paper Company manufactures a greater variety of papers and uses a more diversified and specialized equipment than any other paper manufacturer in the world. A large majority of their mills are located at Holyoke, Mass., the center of the paper industry, where the craft skill in the making of fine papers has been developed, and where the finest craftsmen in this country have learned their trade.

The Watermark of Excellence

AMERICAN WRITING PAPER COMPANY
Holyoke, Mass.

AMERICAN WRITING PAPER COMPANY

EAGLE A PAPERS: BONDS — WRITINGS — LEDGERS — BOOK PAPERS — OFFSET PAPERS — COVER PAPERS — PAPETERIES — TECHNICAL PAPERS — SPECIALTIES



Storing Coal at a Labor Cost of Less Than 1c Per Ton

Beaumont

A Few Plants Using Beaumont Equipment

Wilmington & Phila. Traction Co. Wilmington, Del.
Alfred Wolstenholme & Sons Co. Philadelphia, Pa.
Philadelphia Suburban Gas & Elec. Co. Cromby, Pa.
United States Nitrate Plant No. 1 Sheffield, Ala. (2 contracts)
Monadnock Paper Mills Bennington, N. H. (2 contracts)
National Electrolytic Company Niagara Falls, N. Y.
Baldwin Locomotive Works Philadelphia, Pa.
Michelin Tire Co. Milltown, N. J. (2 contracts)

In determining the most efficient system of coal storage for your plant, give sufficient consideration to the labor element that enters into the operation of the storage system. A system that requires a licensed engineer or skilled operator is actually a liability, because such men are expensive and not readily replaced if they quit for one cause or another.

With a Beaumont Cable Drag Scraper System of coal storage, no skilled or licensed labor is necessary. Should the operator get sick or quit another man can step in and do the work without loss of time or money.

A Beaumont Cable Drag Scraper System is not only simple in operation but extremely economical in construction cost—no complicated machinery or expensive trestle work. Quickly installed or readily removed to a new location.

Look at the detailed sketch of the Beaumont Cable Drag Scraper System shown in the oval. Notice how the Drag Scraper hauls the coal out over the pile. 50 to 100 tons an hour can be stored at a labor cost of less than 1c a ton. The storage area may be any size or shape.

The coal is discharged into a hopper and elevated to a chute which piles it up. From there the Drag Scraper distributes it over the storage area. All the operating is done from the machinery house by *one* man. Any size coal is handled and the various sizes can be stored separately.

The advisability of buying coal during the slack season, and having it shipped in before the railroads get tied up with moving crops and severe weather, requires no argument. The Beaumont book "Cable Drag Scraper Systems for Storing Coal" gives further evidence of the wisdom of selecting this economical and dependable system. Send for it.

R·H· BEAUMONT CO·

Coal and Ash Handling Systems for Boiler Houses

394 Arch Street **Philadelphia**

Coal Is King?

"WE HAVE been saying so much about the coal situation, that we are fearful that someone may think we are out of subjects to discuss, but this question of coal supply is so important that it seems to merit a constant reminder to paper and pulp manufacturers, so that every effort may be made not only to get sufficient coal for the present need, but to get every pound possible stored away for this coming winter.

In a bulletin which the American Paper & Pulp Association recently sent out, the whole space is devoted to the question of coal, and while this bulletin takes a somewhat optimistic view of the situation, it calls the present condition chaotic, but just as this bulletin was issued telling about the production of coal, another report brought the news of a strike among the coal miners of Illinois, closing down most of the mines in this state, at least temporarily.

The question of car shortage seems to be the principal drawback to getting coal, and though we understand that railroads have recently ordered some 28,000 freight cars and 600 locomotives, practically none of them can be made of use for the coming winter. There is no doubt but that some of the talk about coal shortage is propaganda to help line the pockets of those who would like to have the world in general think we were all going to freeze next winter, but where there is so much smoke there must be some fire, and hence the thing to do is to get coal.

We have for years urged that paper mills put in coal storage systems, and some mills have adopted this plan. The point is this: If you have the right kind of storage system, and can get coal to store, you then have everything ready to take it in, but if you have no proper storage facilities, and try to pile coal most any place that you can find when it comes in, you are liable to lose much more than the right system would cost, from deterioration or possibly fires. Proper storage facilities will pay abundantly.

The bulletin above mentioned says that the paper industry may help itself, and other industries:

1—By cooperating as effectively as possible in prompt unloading of cars, whether or no there is a penalty for failure to unload in a given period.

2—By more complete utilization of all car equipment through increasing tonnage carried by cars and in other ways.

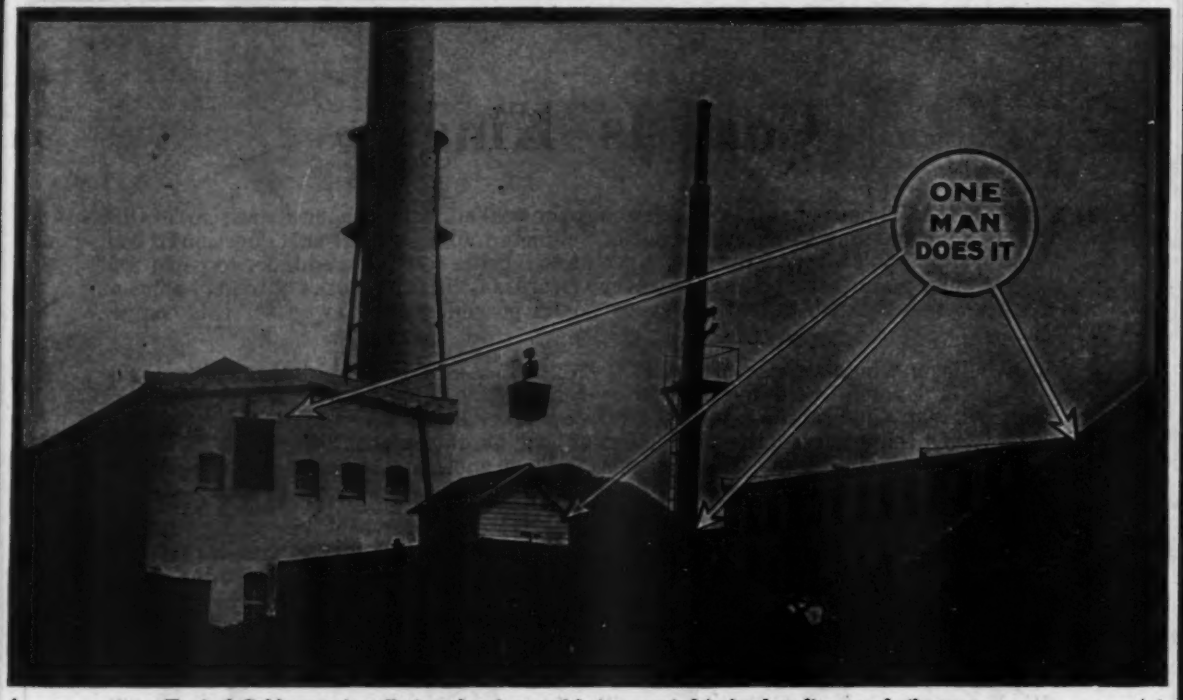
3—By increasing facilities for storage of coal.

4—By giving moral support, at least, to the railroads in their efforts to give service required by industries. Let the railroads and the papers know your attitude.

5—By joining with other individuals and other industries in combatting radical propaganda through seeing that the public has the facts as to production of coal, the difficulties being experienced by the railroads, and the needs of the industry. Right publicity will go far towards heading off the spread of a panicky feeling, both as to the coal and the railroad situation. Lend your support to the activities of local organizations in this crisis. Associations of manufacturers, chambers of commerce, traffic organizations in different states are very active. Your personal efforts with them will count.

6—By keeping the association informed as to your coal situation and the general condition in your community. A common knowledge of common difficulties dispels fear and creates confidence. It is the business of the association to help in creating confidence—when there is reasonable ground for it.

Conditions would seem to indicate that there is no need for a panicky feeling as to the coal situation. There is need, however, for constant vigilance and aggressiveness. The situation will not solve itself. Militant cooperation between individuals and industries—with confidence as to the outcome—will keep wheels turning and coal on the way to the mills.



Typical Cable-way installation showing coal being carried in bucket direct to boiler room.

Increased Earnings

To Owners of the

Godfrey System

Records show that Paper Mills using a Godfrey Conveyor are materially reducing their handling costs and increasing their profits.

Both small and large concerns in all parts of the United States are profiting from "Godfrey" Service. They have found a cure for labor troubles, excessive demurrage charges and handling difficulties—all at a cost that will pay for itself in a short time.

The Godfrey Conveyor can be adapted to handle baled rags, paper and straw as well as coal, coke and ashes.

It will pay you to investigate

A request for our representative in your territory to call and demonstrate the savings of a "Godfrey" involves no obligation. Just write us when and where.

GODFREY CONVEYOR COMPANY

119-139 13th Street ELKHART, IND.

Men to Do This Work Are Hard to Get and Hard to Keep

Demand anywhere from $4.00 to $6.00 daily (each)—tire easily—delay loading of your trucks—lessen output and profits.

Jeffrey Radial Loaders

Do away with 5 to 10 men—are built to stand the heavy service of handling coal, ashes, sand, gravel, crushed stone and other loose materials.

Radial Loaders feed into the pile 8 to 10 feet. No hand shoveling or mechanical devices needed to bring material to the buckets.

Radial Loaders are built in two sizes: Type "K" loads one cubic yard per minute. **Type "G"** has a capacity of 1½ to 2 cubic yards per minute.

Write for catalogs No. 288-Y and 309-X, illustrating and describing both types of Radial Loaders

The Jeffrey Mfg. Co. 813 North Fourth Street **Columbus, Ohio**

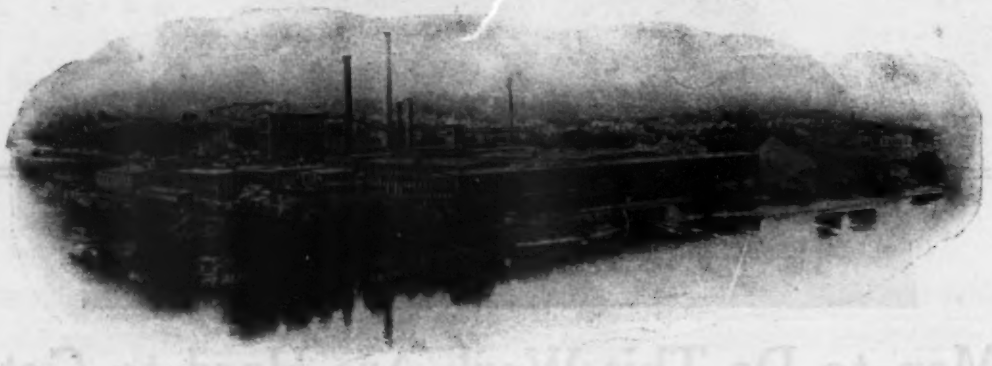
Branch Offices:

New York Scranton Chicago Denver Boston Charleston, W. Va. St. Louis Los Angeles Philadelphia Detroit Milwaukee Birmingham Buffalo Montreal Pittsburgh Cleveland Dallas

Type "G" Radial Loader handling sand

Manufacturers of Elevating, Conveying, Crushing, Pulverizing Machinery; Chains; Industrial Locomotives, etc.

Type "K" Radial Loader handling coal



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High Grade Machine Finish and Super-Calendered Book Papers

CAPACITY OF MILL, 275 TONS OF PAPER PER DAY

Nashwaak Pulp & Paper Co. Limited

Manufacturers of

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Canadian Bleached Sulphite

Mills: St. John, N. B., Canada

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Maine Coated Paper Co.

Manufacturers of

Polar, Hi-Tone and North Star Coated Book Papers

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Mills: Rumford, Maine

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Marathon Paper Mills Co.

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Paper Manufacturers

Carton and Paper Can Stock

Sulphite Bonds
Waxing Papers
Bleached-Specialties

Machine Glazed Plain and Watermarked Specialties

¶ One 100-inch Cylinder Machine, producing Solid Manilas, Single Lined and Double Lined Boards for Carton and Paper Can purposes.

¶ One 120-inch Fourdrinier Machine, producing Sulphite Bond, and Bleached Papers for special conversions purposes.

¶ Two 120-inch Yankee Machines, producing Machine Glazed Papers in Plain and Special Stock Designs, as well as Special Watermarks.

Daily Production, 200,000 lbs.

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CONWAY BUILDING,
CHICAGO

TO INSURE LONG SERVICE
in the SMELTING FURNACE
Use

Alberene Stone

(A Fine Grade of Soapstone)

Alberene Stone Has Been Used in the Following Mills

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Howland Pulp & Paper Co.	Thilmany Pulp & Paper Co.
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ALBERENE STONE COMPANY

223 East 23rd Street, NEW YORK
214 North Clinton Street, CHICAGO
51 Bristol Street, BOSTON

Will Paper Prices Decline This Winter?

A CERTAIN paper mill man met a certain paper jobber recently, and said—"Joe, do you think paper prices are going to ease off soon, or do you think that the market will remain firm this winter?"

And Joe said: "No! Prices will not decline this fall, but on the contrary I believe they will generally advance this winter."

And the jobber said: "Why?"

And Joe replied: "Because the underlying conditions in the paper business are fundamentally very strong. In the first place, there are no reserve stocks of paper anywhere in the world; and secondly, there is not enough pulp and paper produced to supply current demands. That puts the pulp and paper business in a primary position of outstanding strength."

Another important element of strength is found in the fact that production problems this winter are going to reach their peak. I direct your attention to the impending coal shortage. Many mills will be unable to produce pulp and paper this winter due to curtailment of coal supplies.

On August 1st, the lake ports were short some 27,000,000 tons of coal. This shortage cannot be made up before navigation closes. That means that not only householders and industries are short of winter supplies, but all our great railway systems in the Northwest, the non-producing coal trade, are without winter stocks on their lines.

One of these great systems alone on August 1st should have had 500,000 tons of coal in its various yards, terminals, roundhouses and coal stations, but on that date they had not accumulated any coal. When you stop to think that this road alone was short 12,500 cars of coal, 40 tons to the car, you can see how serious the coal situation is for them and everybody who is dependent on them for coal transportation.

What are these railroads going to do when winter sets in and they have no coal to move trains? Confiscate all coal on their rails of course.

Here again the transportation situation confronts us—LACK OF CARS. The coal shortage is primarily a car shortage. Likewise a raw material shortage is primarily traceable to the car shortage.

Where are we to get cars to bring in our wood? We are buying our cars now for that purpose. I recently saw a letter from a big paper manufacturer in the East, saying that they had 50 cars of manufactured paper in their mill, all of which was sold and needed, but they could get no cars to ship it out. Other mills are similarly affected.

There is a 3,000,000,000 bushel crop of grain being harvested this fall, and already the demand for cars to move all other products has overtaxed the equipment of the railroads.

Coal shortage, raw material shortage and car shortage are all going to make for lessened or at least static production. If no more paper can be produced or the production be in the least curtailed, prices will immediately rise in effort to offset the loss.

Look at print paper, the basic commodity in the industry. Prices have quadrupled since 1914. Small town papers are going out of business; city papers are combining; newspaper circulation is boosting upward; subscription prices are advancing; and advertising rates rising all the time. Why? No reserve stocks—not enough current production to supply current demand. Prices must advance, and that's not the half of it.

Prosperity! Our prosperity in America is simply incalculable. A 3,000,000,000 bushel crop of small grains this year, one of the record breaking crops and to be marketed at highest prices on record.

Recently the President of the Thrift Society, a national organization, stated that $3,000,000,000 of good currency of this commonwealth was in the pockets or personal possession of the proletariat; at least, they had it. It was not in the banks. Why have they kept it out? TO SPEND!

Savings are increasing in this country, but spending money on a big scale is still the order of the day. Everybody has it. Why the last French Government loan of one hundred millions of dollars was oversubscribed by double that amount the first hour the books were open.

Now, that is all significant. These things all mean something, and it is this—that this country is rich; its mechanics and agriculturists are wealthy.

The purchasing power in the country is also on the rise. The people want goods. They have the money.

A few years ago when the railway lines spent in this country $1,000,000,000 per annum, we had good times, but just let me give you two items of this year's income, and then you tell me what's going to happen:

First—The annual payroll of the railways is $3,600,000,000.

Second—The farmers have a 3,000,000,000 bushel small grain crop this year, worth at least calculation $1.50 per bushel, that's $4,500,000,000; making a total income for these two classes only for the year $8,100,000,000.

The facts are that there is not enough pulp and paper made in this country and Canada to print their newspapers, magazines, school books, bibles, books of fiction, history and encyclopedias, and make their writing papers, envelopes, tablets, ledgers, sales slips, toilets, tissues, bags, wrappings, cups, containers, rugs, paper furniture, boxes, and other various paper products too numerous to mention.

These high living, rich, prosperous, money-making, money-spending Americans will have all of these. They are educated to them. They demand them as essential necessities.

Then remember one more very significant thing. All during the dull vacation summer period, the great Reserve Bank System of this country had clamped down tight on loans. Money rates advanced and interest went to 9 per cent. This shut down producers who had been selling on close margins and long credits. It also stopped prospective building. The result is that the wise manufacturer went to the great consuming public for his money, which he couldn't borrow from the bank, and got it by raising his prices and shortening his credit. Now interest rates are falling and banks are looking for borrowers, which goes to prove that money is plentiful but manufactured commodities are scarce.

Will paper prices decline this winter? Analyze the situation from any of a hundred different angles, and the answer will be "they will not."

MUNISING PAPER COMPANY

MUNISING MICHIGAN

MANUFACTURERS OF

MUNISING M BOND

COLOR QUALITY AND UNIFORMITY
HAVE MADE FOR IT
AN ENVIABLE REPUTATION

SALES SERVICE

FOR

PAPER MANUFACTURERS

It is well to have behind one's business the sales energy and distributing resources of an organization equipped with ample facilities to render the fullest measure of service.

We Offer Paper Manufacturers the Best Existing Sales and Distributing Service, Backed by the Experienced and Able Co-operation of an Organization of Large Capacity

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INCORPORATED

PAPER MANUFACTURERS' SELLING AGENTS

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Telephones 4784 and 5986 Vanderbilt
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Our Loss

¶ of time, effort, money, etc., in your behalf results in

Your Gain

¶ the advantage of proper sources of supply for your requirements.

Let us know your needs so we can endeavor to help you.

STREHL OTENS CO., Inc.

Paper Boards and Specialties

Fifth Avenue Building
NEW YORK

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CHICAGO

ELASTIKOTE

1923 SEPTEMBER 1923						
SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
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23/30	24	25	26	27	28	29

How Will It Look Three Years From Now

THE real test of paint is not its appearance when it is put on the surface, but how it looks three or four years later. Even a poor and cheaply made paint looks well when first applied, but after short exposure to the weather it loses its sheen and protective qualities. A close examination will show that the paint film is full of holes, which allow moisture to work through into the undersurface.

Elastikote

—on the other hand, retains its fine appearance for a very long time and presents an unbroken surface to the weather, which absolutely excludes moisture from the surface it is protecting whether it be wood, brick or metal.

The best proof we have of the durability of Elastikote is the large number of customers who order again after a lapse of years. Some of the most prominent manufacturing plants in the country are now using Elastikote—a list will be sent upon request.

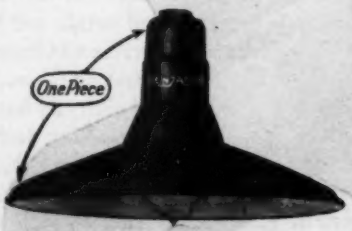
One of our representatives will be glad to call with complete information regarding Elastikote and other Tropical Products suitable for your use.

THE TROPICAL PAINT & OIL CO.

CLEVELAND, OHIO

Specialists in the Manufacture of Protective and Decorative Coatings for Industrial Plants

Benjamin Reflectors Meet Every Industrial Illumination Requirement



Benjamin Shallow Bowl Seamless One-Piece Reflector Socket

Courtesy Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.

In every industry the price of safety, production, workmanship and contentment is correct illumination. This is fundamental as proven by exhaustive, practical experiment.

Benjamin Industrial Illumination equipment stands for very definite things in the industry. Each Benjamin reflector is a real interpretation of the best Industrial Illumination standards and engineering practice. They are superior as reflectors of light; in ease and economy of installation and in maintenance.

Benjamin Porcelain Enameled Steel Reflector Sockets are absolutely one piece in every sense of the word; without welds, seamless — fine conceptions of what lighting units should really be.

Benjamin Industrial Illuminating Engineers are ready at any time to confer with engineers, architects, contractors, etc., etc., in solving problems of correct Industrial Illumination.

For details, write the Advertising Department, 806 W. Washington Blvd., Chicago

BENJAMIN
PRODUCTS
The following are divisions of Benjamin products on which we will be glad to send information:
Industrial Lighting Division
Electrical Division (including Benjamin Two-Way Plug)
Pressed Steel Products Division
Enameled Products Division
Starrett Panel Board Division

BENJAMIN ELECTRIC MFG. CO.

Factories: Chicago and Desplaines, Ill.

Sales and Distribution Offices:

247 W. 17th St., New York — 806 W. Washington Blvd., Chicago

580-582 Howard St., San Francisco

Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Canada

The Benjamin Electric, Limited, London, England

BENJAMIN

Makers of Things More Useful

"Michigan" Wood Pipe

"Michigan" Combination Steel and Wood Pipe

LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER *and* PULP MILLS
Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

THE MICHIGAN PIPE COMPANY

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Boston, Mass.....93 Broad St.
Cleveland, Ohio.....919 American Trust Bldg.
Chattanooga, Tenn.....702 James Bldg.
Montreal, Que., Canada.....204 St. James St.

"Steel for Strength—Wood for Durability"

EDITORIALS

Who's Your Watchman?

IN one of the quarterly reports of the National Fire Protection Association appears a story to the effect that a fire started in a locker in a printing plant, which contained workmen's overalls, and that it burned the top of the doors and locker so that a large volume of heated flames was carried by the draft of an elevator shaft to the ceiling, causing sixty-four sprinklers on the floor to open. The fire occurred at night while the watchman was on duty, but he did not investigate the cause of the ringing of the alarm bells. Several employes in the building heard the alarm bells and found the fire on the second floor. The blaze was held in check by the sprinklers until the fire department arrived and put it out. But what would have happened had there not been any sprinkler system or other employes in the plant at the time? Sprinklers are necessary, but how about the watchman, whose duty it was to hear the alarm bells and make an investigation?

Years ago a watchman was hired for his ability to properly take care of the job, but today too many men are kept on the job as "watchmen" because they are too old, or crippled, and "can do nothing else." It would be far better to pension an old or crippled employe than to put the safety of the plant in his hands, when he is not able to properly do the work.

It was not always this way, for the story is told of how in England, back in the sixteenth century, the watchman was instructed "of all manner of casualties; of fire, of the crying of children, you shall due warning make to the parties as the case shall require. You shall make due search of all manner of affrays, bloodsheds, outcrys and all other things that be suspected."

There is also a story told of how in the thirteenth century, when a murderer had escaped from the city during the night, and inquiry having disclosed that a watchman had omitted to fasten a gate by which the murderer had escaped, the watchman and the mayor were both found guilty, sentenced to death and executed. Surely the watchmen of those days had to be both "stoute of bodye and quick of mynde."

This type was quite different, however, from the watchman in a southern factory. The superintendent of this factory, so the story goes, was at his home, and having noticed that the plant was on fire, rushed to the building and found the watchman standing in another part of the plant with his watch-clock in hand. When he asked the man why he didn't get out the hose and call for help, he replied: "I can't go out now, as it is time for me to punch my clock." To this watchman, it was more necessary to have a good record on the clock than to save the plant.

Another story is told of how a fire started in an out building near a big plant. A passerby saw the fire and called the fire department. The fire was put out, and then a search revealed that the watchman was in the building sound asleep, and had not so much as heard the fire engines.

It is a good idea to have all kinds of fire alarms and clocks, but these alone will not suffice. It takes something more than a machine or mechanical device to always detect and report a fire, and particularly to call for help.

Too many firms depend on the mechanical device, and think the man on the job is a secondary matter, and that anyone who is not able to do anything else, will serve as a watchman.

A watchman should not only be stout of body and quick of mind, but should be on the job every minute, and never go to sleep during working hours. The job of watchman is an important one, and the right man for the job ought to be selected with as great care as is used in selecting a man for any other important job. This kind of a man, with the right kind of mechanical help, will generally be around when he is needed.

Fire and Accident Prevention Day

THE date of October 9 is the anniversary of the great Chicago fire of 1871. Observance of that date as a fire and accident prevention day is observed by three-fourths of the states in the Union.

The fire losses in the United States and Canada for the first eight months of this year were $215,655,500.00, or over forty million more than that for the same period last year. This means that nearly one million dollars a day is going up in smoke and is a dead loss to the resources of the country. It is stated on authority that seventy-five per cent of these fires are due to carelessness and are easily preventable.

The observance of this date is the encouragement for business organizations and neighborhood clubs to hold meetings and arouse interest in fire prevention. Special fire drills should be held on this date in all paper and pulp mills in order to impress the importance of the anniversary on all employees.

An ounce of fire prevention is worth a pound of fire extinguishment. The way to get lower insurance rates is to have fewer fires.

"When you finish a job leave everything safe," says the National Safety Council.

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As is well known, Basic Colors represent a group of dyestuffs indispensable to a number of industries, such as:

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Printing of Cotton Goods
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Du Pont Crystal Violet Base
Du Pont Methyl Violet NE
Du Pont Methylene Blue ZX (Zinc Salt)
Du Pont Methylene Blue B (Zinc Free)
Du Pont Victoria Blue BX and Conc.
Du Pont Victoria Blue B Base
Du Pont Victoria Green Small Crystals
Du Pont Victoria Green B Powder
Du Pont Auramine O and Conc.
Du Pont Chrysoidine G (Yellowish)
Du Pont Chrysoidine R (Reddish)
Du Pont Rhodamine B and B Extra
Du Pont Basic Brown BXN (Reddish)
Du Pont Basic Brown GX (Yellowish)
Du Pont Nigeria Black BX and GX

and the closely related:

Du Pont Phloxine B
Du Pont Rose Bengal
Du Pont Erythrosine B

The completeness of this group of dyestuffs will easily be recognized as of utmost importance to many industries. The purity of shade and strength represent the best that can be produced. The standardization is given the most careful attention.

Do not fail to see our unique display at Sixth National Exposition of Chemical Industries, Grand Central Palace, New York, week of September 20th. You are cordially invited to make our booths, 7 and 8, your headquarters.

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With the existing variance in the quality of sizing ingredients—and with the alum shortage as a further contention—it is attempting the impossible to uphold former quality standards when the sizing operation is governed by ordinary methods.

* * * * *

There never has been a time when a greater need has existed for the most modern sizing condition made possible by the

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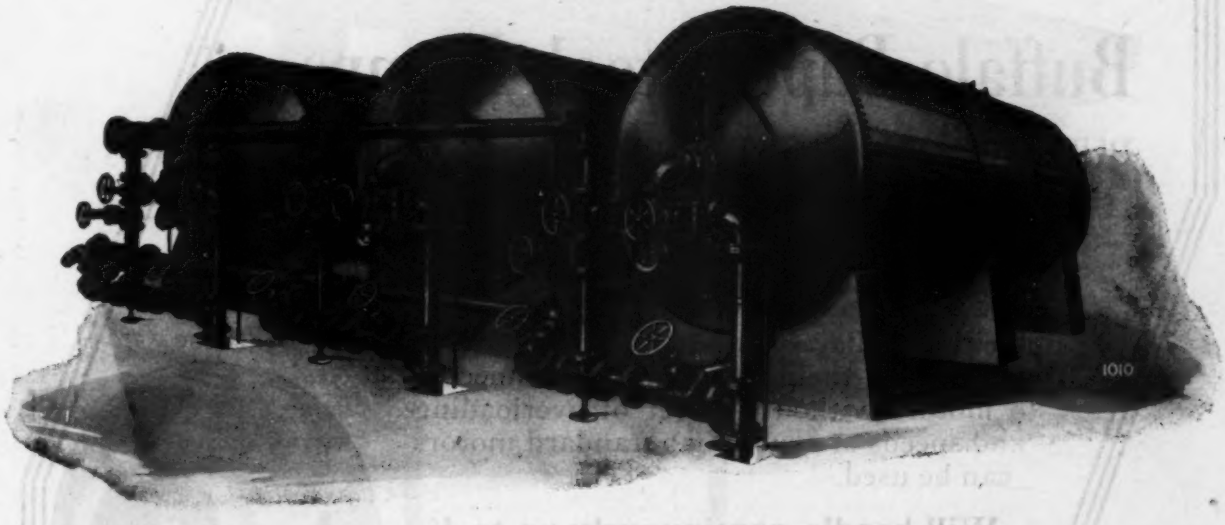

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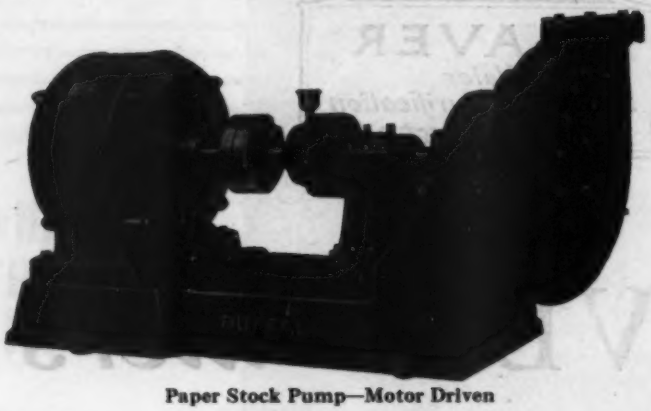

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Buffalo Paper Stock Pumps

BUFFALO PAPER STOCK PUMPS are of heavy duty design—do not heat under continued service—maintain their high efficiency over long periods of service—and repair expense is very low.

For either pulley or motor drive. Characteristics of these pumps allow them to be directly connected to motors without danger of overloading and speeds are such that standard motors can be used.

Will handle continuously up to 4% ground wood stock without danger of clogging.

Buffalo Paper Stock Pumps are regularly furnished with specially designed enclosed type impellers, with extra wide openings, but for special cases, where efficiency is not of prime importance, open impellers can be used.

Write for Bulletin 953-27.

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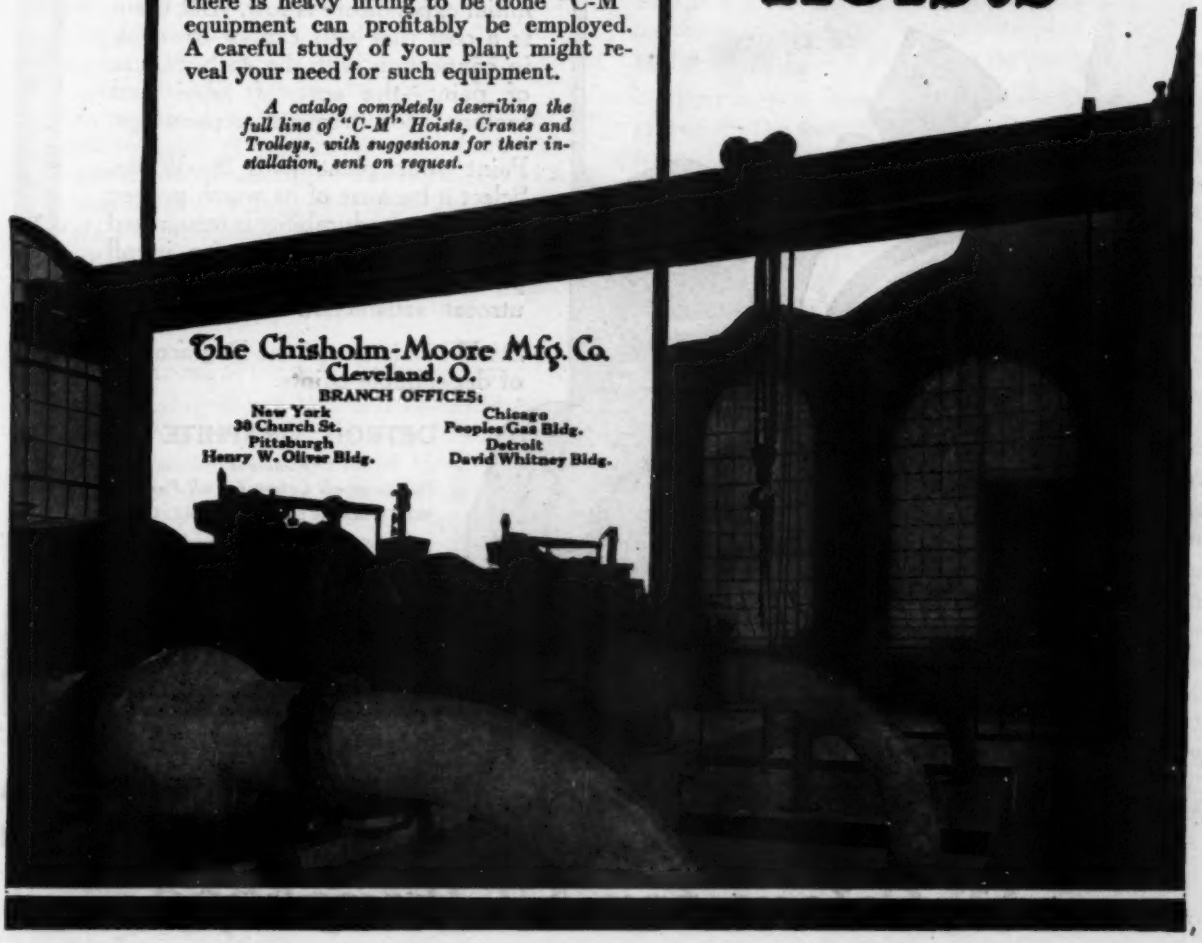

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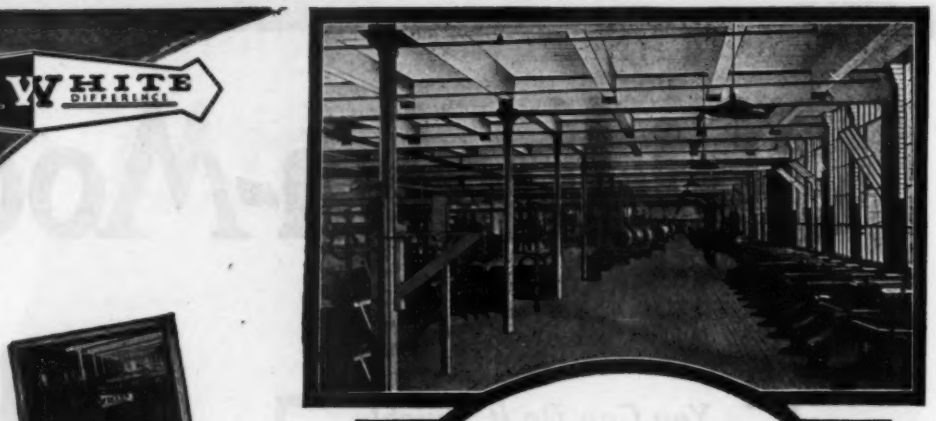

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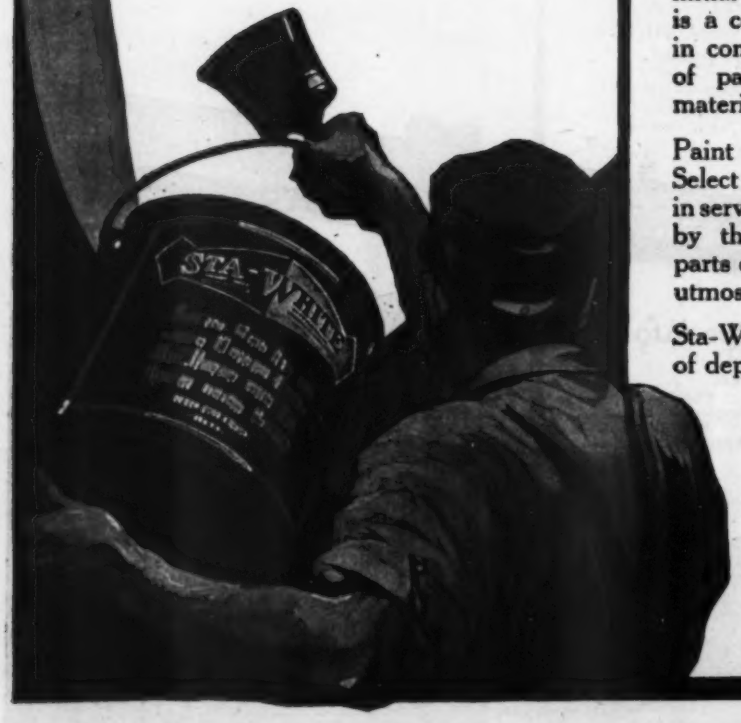

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The cost of mill white paint for plant lighting must be based on a period of years, because durability determines the ultimate cost.

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DEGRACO PAINTS

All Colors for All Purposes

Fall Meeting of the Technical Association of the Pulp and Paper Industry

Held on September 1, 2 and 3, 1920, at Saratoga Springs, N. Y.

THE fall meeting of the Technical Association of the Pulp and Paper industry was held at the Casino in the park opposite the Grand Union Hotel, Saratoga Springs, New York, September 1 to 3, 1920, and proved to a most enjoyable and beneficial event. The Committee of Arrangements were most courteous and attentive in carrying out the details of the program, which provided so many entertaining and instructive pursuits for the three hundred and fifty members and guests who attended.

The members arrived at the hotel on Wednesday morning and Secretary Thomas J. Keenan and his staff were prepared early to take care of the registration. At 10:00 o'clock the business meeting was called to order. President Raymond S. Hatch in his opening address referred to the room being at one time a "Hall of Chance," but that that time had departed, and on this occasion, at least, it was a "Hall of Facts." He spoke appreciatingly of the large number who were in attendance and called on Mr. Edward B. Ashton, President of the Saratoga Chamber of Commerce, to deliver the address of welcome. Mr. Ashton spoke of Saratoga Springs as being surrounded by many of the largest mills in the State of New York, and the fact that American ground wood pulp was originated in that region, was a most fitting place for the association to convene. Mr. Geo. S. Witham, Sr., manager of mills of the Union Bag and Paper Corporation, was called on to make the response, which follows:

Address of Geo. S. Witham, Sr.

"In responding on behalf of the Technical Association of the Pulp and Paper Industry to the gracious address of welcome tendered us by the City of Saratoga Springs, the speaker's task is lightened very considerably by a deep feeing of the appropriateness of this particular section of our country for a meeting of this particular association.

"The Technical Association has met in years past in many different sections of the country, and all of these meetings have been occasions replete with pleasure and profit to all of those so fortunate as to be able to attend; however, both as a paper-maker and as a resident of the upper Hudson valley, I have no hesitation in stating that no section of the United States could be selected for this meeting which would be more intimately connected with the development and progress of the paper industry than that in which the various sessions of the present meeting will take place.

"Not far from here, in the foothills of the Adirondacks, was made the first ground wood pulp ever produced in America, a development so significant in the history of the paper industry that it is needless for me to comment on its importance. For many decades the Adirondacks furnished one of the principal sources of supply of wood for paper making in the United States; and, although necessarily diminished, that supply is not yet by any means exhausted, and should, with proper methods of reforestation, remain a permanent asset to the nation. The Adirondack region cannot well be put to profitable use for agricultural or other purposes, and it is to be hoped that such measures will be taken by National and State governments that it will remain throughout the centuries a permanent, scientifically maintained forest, yielding successive crops of pulp wood, as well as timber for other purposes, and at the same time affording a forest region for sporting and recreative purposes, of which the densely populated cities of the northeastern United States are permanently in need.

"That such an idea is no idle dream is abundantly proved by the fact that in Europe large amounts of pulpwood are being cut annually from forests which have been in use for a period of time which makes the entire history of the State of New York seem but a brief chapter.

"There has been a great deal of discussion during the last few months concerning the tendency of the Canadian Government to refuse the use of their reserves of pulpwood to American paper manufacturers, and to gradually withdraw all possibility of our permanently depending on that source of raw material. The adjustment and settlement of this problem is a matter that we may well leave to the politicians of the two nations involved. There is no reason to doubt that a reasonable and mutually satisfactory settlement can be arrived at, for during a period of over a hundred years—the United States and Canada have successfully arbitrated numerous more serious disputes — disputes concerning fisheries, boundaries, tariffs and many other matters, with the result that the boundary line between the two countries stands today—a most hopeful fact—the longest international boundary in the world, unmarked by a single fortification in actual use, and, in times of peace, unguarded by a single soldier.

"However, harking back to the forests of the Adirondacks, the lesson for us in the present situation

is that if the matter of forest conservation had been taken in hand years ago, we would not have been ever in the humiliating position of having to negotiate with any other nation for pulpwood essential to our paper industry. With the tremendous resources of forest wealth originally in the possession of the United States, we have nothing to blame but our own shortsightedness as a nation for our present predicament. However, it is no use to cry over spilt milk. We have made our mistakes and—I hope—have learned the resultant lesson. The thing to do is to think seriously about this matter of conservation and to provide for the future.

"All of the development of the paper industry, is the fruit of the work of technical men, such as the members of this association, on whose behalf I am now speaking. I have attempted to explain to those of our friends not familiar with the association and its work, just what and why it is. In thanking Mr. Ashton and Citizens of Saratoga Springs for their cordial and graciously expressed welcome, delivered by the president of the Chamber of Commerce, I feel that I will not be saying too much, if I state that the Technical Association of the Pulp and Paper Industry has, by its past work and its future prospects, fitted itself to be spoken of as a body which the City of Saratoga Springs honors itself in honoring."

Before reading the report of the Executive Committee, Secretary Keenan took occasion to express his appreciation of Mr. G. S. Witham, Sr., in the following manner:

"Mr. George S. Witham, Sr. is unique in the industry. He is a man who has risen up through the ranks. He has been through every department of the paper mill, and knows whereof he speaks much better than I, or my associates perhaps, who are younger than I am. He has just published a book which is one of the most valuable contributions to the literature of paper making which has appeared within several decades — his textbook, Pulp and Paper Making. The remarkable thing about his book is that it deals with the mechanics of the subject in such an informing manner. He speaks as one in authority, who has handled the machines he describes; and I am sure that every superintendent, every man who has to do with the manufacture of pulp and paper, will welcome this book by Mr. Witham, and I am sure that it is a high privilege for the Technical Association of the Pulp and Paper Industry to have Mr. Witham welcome us in reply to the speech of the President of the Chamber of Commerce in such an informing manner.

"I thank the gentlemen for allowing me to relieve my system of those sentiments! But if you will read Mr. Witham's book, you will appreciate my point of view."

Report of Executive Committee

The Executive Committee reported a steady increase of membership since the annual meeting, held in New York four months ago, the total membership now exceeding 600. Two members who had been lost by death were George C. Sherman and Henry Earl Surface. It was recommended that a special committee be appointed to draw up suitable memorial resolutions.

It was stated in the report that after long and careful deliberation, the Executive Committee had decided to abandon the idea of publishing a trade journal through the Tappi Publishing Corporation. In place of this, the association is to undertake the publication at least semi-annually of a volume of proceedings, transactions, abstracts of literature and original articles. The Committee said that a beginning has been made by the publication of a revised edition of the Paper Testing Committee's report. The work bears the title "Paper Testing Methods," and constitutes a practical treatise on approved modern methods for testing papers by microscopical, chemical and physical means. The work is illustrated from photographs and one of the chapters deals with the fibers used or proposed for use in papermaking. Members of the association will be supplied with the volume free of charge and copies will be on sale at $1 each.

The committee recommended an increase in the annual dues of members and associate members to

Group Picture Taken at the Fall Meeting of the Technical Association

$25, the subscription for juniors being allowed to remain at $5 as at present. As this necessitates an amendment to the Constitution and By-Laws, unanimous consent was asked and granted for a suspension of the rules. The amendment was adopted by unanimous vote.

In conclusion the Executive Committee expressed hearty appreciation and thanks in behalf of the association to the paper manufacturers of the Hudson River and associated industries for the splendid entertainment and educational features which had been provided for the Fall Meeting.

At a later sitting of the association, a resolution was adopted expressive of the great loss sustained by the association in the death of Henry Earl Surface, who had served long and ably as Chairman of the Committee on Bibliography. The late Mr. Surface was graduated as Bachelor of Science and Chemical Engineer from the Ohio State University. During the years 1907 to 1914 he conducted numerous pulp and paper investigations for the United States Department of Agriculture. From 1914 to 1915 he was consulting engineer for the Government of Tasmania. He was also for a time lecturer in Forest Products at the University of Wisconsin. The Committee on Resolutions submitted the following minute through George H. Harvey.

Henry E. Surface

It has pleased the Divine Ruler to remove from us Henry E. Surface, with whom it has been a pleasure for members of the Technical Association to work for many years, and we desire to record our great loss.

Henry E. Surface's wide knowledge of the pulp and paper industry, his untiring energy and capacity for painstaking investigation, his absolute sincerity and devotion to his task, his integrity of purpose and sterling character will always endure to his memory and be a source of inspiration to his associates. We, the members of the Technical Association of the Pulp and Paper Industry, express our sorrow for the loss of his advice, assistance and friendship, and convey to his family our deep sympathy in their affliction.

Committee Reports

The reports of the various committees were then made in the following order:

"Bibliography," Clarence J. West, Chairman.

"Heat, Light and Power," Howard S. Taylor, Chairman.

"Joint Committee on Testing Moisture in Pulp," E. C. Tucker, Chairman.

"Paper Testing," Frederick C. Clark, Chairman.

"Soda Pulp," George K. Spence, Chairman.

"Standard Methods of Testing Materials," E. C. Tucker, Chairman.

"Sulphite Pulp," W. E. Byron Baker, Chairman.

"Vocational Education," George E. Williamson, Chairman.

J. M. Stevenson, Editor of "Pulp and Paper Magazine of Canada," gave an excellent account of the progress of the text books now in preparation. He was unable, he said, to tell just when the books would be ready, but that they would be done as rapidly as accuracy permitted. He said that much had been done in the nineteen months since the association approved the plan and voted the money.

At 12:00 o'clock the meeting adjourned for dinner and recess.

Afternoon Session

The business of the meeting was reconvened at 2:00 o'clock, when a number of interesting papers were read.

R. E. Lofton, who with M. F. Merritt, is associated in the Paper Section, Bureau of Standards, read a report on "A Method for Identifying and Estimating Sulphite and Sulphate Pulp in Paper." "This work was taken up," he said, "in order to develop a method of identifying sulphate pulp in kraft and wrapping papers." Several methods such as Klemm's, Schwalbe's and Fannon's were discussed in some detail and the value of these methods was shown.

The problem was attacked from the point of view that dyes have different affinities for different types of fibers or for fibers that have been treated differently, by cooking or bleaching. In brief, the method consists of staining properly the sample of paper, when disintegrated and placed on a microscope slide,

of the Pulp and Paper Industry, Saratoga, N. Y., Sept. 1-3, 1920

with a combination of two dyes in different proportions after a carefully prescribed method. The dyes used are malachite green and basic fuchsin. The color contrasts are definite when the method is carefully followed, the sulphate developing a blue or bluish green tint and the sulphite fibers taking on a lavender to purple color. An account was given in the paper of work with various dyes of different brands and the accuracy of the method was shown. This whole study will shortly be published in complete detail by the Bureau of Standards.

"A New Felt Cleaning Device as a Means of Production," was the subject next covered by C. A. Woodcock.

"Boiler Room Efficiency Increased by a New Mercury Boiler," was an extremely interesting subject handled by W. L. R. Emmett, of the General Electric Company.

The paper referred to in the report by Geo. K. Spence entitled "Curtailing Bleach Consumption by Adding Sulphur to Digester Liquor," was then read.

C. H. Allen and E. J. Trimbey read papers on "Automatic Cooking Control for Sulphite Digesters" and "A Continuous Mixing System for Newsprint Mills."

In a preliminary report on "New Method for Testing Lime and Cement Bags," P. L. Houston, of the Paper Section, Bureau of Standards, said that it was found necessary to obtain a laboratory test which more nearly reproduced service conditions in order properly to prepare specifications for this material. A test, developed for use with textiles, was adapted and may be called a "stress-strain" or resiliency test. A large tensile testing machine is used for this purpose, to which is attached a recording drum device on which is marked the stretch of the material under tension. A description was given of the method of developing this test and calibrating the chart. The resiliency of the paper is determined by first obtaining the average tensile strength of the material, choosing a value ten percent less than this on the scale. The paper is put under strain and then released, a record being made of the stretch and the regain. A series of loops is obtained and this is continued until the paper is ruptured. Numerous samples of suitable paper were tested and graded by this method and the paper made up into bags was tested also by filling with sand and repeatedly dropping a distance of three feet. The grading of these two methods was almost identical and it is thought that the stress-strain test gives an unusually good valuation of this type of paper in comparison with service conditions. This investigation will shortly be published in detail by the Bureau of Standards.

W. E. Byron Baker next addressed the meeting on the subject of "Substitutes for Alum and Rosin in Sizing Papers."

F. W. Williams concluded with an interesting account of a new paper machine hood.

The meeting adjourned at 5:00 o'clock, after a vote of thanks had been extended to the committees for having undertaken so successfully the entertainment of the association.

During the afternoon, a sight-seeing trip was enjoyed by the wives and guests of the members of the association. The trip covered the Springs, Reforestation Nursery, the Yaddo and all other points of interest. And in the evening, they were entertained at the Congress Theater by the presentation of the film "Humoresque."

The Banquet

At seven o'clock, the banquet took place in the dining hall of the Grand Union Hotel. The room was gorgeously decorated with flags, and symbolic of the intimate connection existing between the Technical Section of the Canadian Pulp and Paper Association and our American society, the flag of our Canadian fraters was gracefully draped beside the emblem of Tappi.

Chairman Frank T. E. Sisson kept up the spirit of fun during the entire dinner and was ably assisted by a clever humorist who had been engaged for the occasion. A number of pretty girls sang and danced beautifully.

C. R. McMillan, Vice-President Union Bag and Paper Corporation, excellently fulfilled the duties of toastmaster.

L. H. Shipman, of the Spanish River Pulp and Paper Mills, Ltd., and Chairman of the Technical Section of the Canadian Pulp and Paper Association, was called upon to speak. He extended a hearty invitation to the American members to attend the next meeting of the Canadian section.

The next speaker was George W. Sisson, Jr., President of the American Paper and Pulp Association, who spoke as follows:

Address of George W. Sisson, Jr.

"It is indeed a pleasure and an honor to be the guest of such a company of men as is here assembled; men who have come together to exchange experiences, discuss problems, and gain new inspiration from contact with their earnest fellow workers in their peculiar field of service.

"Your work is typical of the spirit of modern business which realized that in its last analysis what we call business is but a form of service to communities and to the world, having its compensations to be sure, and resting necessarily on sound economic foundations. In the effort to serve efficiently and to contribute to that broadening of the scope of man's usefulness and well being, there is no more essential factor than the man who has in him the genuine spirit of research. That character of mind, that intentness of purpose, that following out of an idea unswerved nor turned aside by non-essentials that rise in the way, that entire devotion to the reaching

of a sound and truthful result, upon that spirit, I say, depends and always has depended the success and development of those things that make for larger living for all men.

"Some of us are apt to regard the man of research as necessarily narrow in his view, and somewhat apart from the practical activities of everyday life, and therefore less responsive to those living and actuating impulses that must be reckoned with in the application of the very principles which he may discover. But even a hurried survey of this group of men will reveal no "cloistered hermits"—far from it, but a lot of **"regular fellows,"** who, while imbued by this spirit of research, have their feet planted on solid ground, and are daily trying out and proving in the most practical way the truth or fallacy of every proposition.

"However, you did not bring me here to 'talk shop' or merely to pass compliments, though I will venture to say that your service to the pulp and paper industry has been and is of untold value, and the results of your work are bound to unfold in most wonderful manner year by year. Speaking for the American Paper and Pulp Association, and thus for the entire industry, I desire to acknowledge the debt that the industry owes to such men as you and to your active organization in particular. Your careful, painstaking work has not only been of immense financial value, but to my mind has resulted in placing our industry in a more dignified position as a truly scientifically conducted activity closely touching the daily lives of our people.

Paper in Demand

"Our industry stands today in the limelight. No other commodity in ordinary use, aside from food, is just now in so great demand, and the whole world has suddenly awakened to the critical situation as to the future raw material supplies for paper. In this demand, and in this situation, men of your stamp and habit of thought find their opportunity. The fields indeed are 'white unto the harvest,' and the skilled reapers are all too few.

"May I not inspire you with a vision of the wonderful possibilities opening on every side, and fill you with a spirit of genuine research, so that, like the Crusaders of old, you will go forth to conquer the giants of ignorance and inefficiency, and usher in a day of happy results in service to others and recompense to yourselves.

"Turning for a moment from the problems of our own industry, and projecting our thought into the realm of world conditions and relations—what a vivid impression we get of the blessed position of America, the boundlessness of the opportunities which are hers for her own good, and for the good of the entire world. The nature of these world opportunities is not political but economic, and this should be emphasized. We shall best serve the world by not thrusting ourselves into the political affairs of Europe, but by taking that part in international commerce and intercourse which is our due and our need for the progress and prosperity of our people.

"At the same time, however, we must not underestimate those humanitarian obligations that rest upon us, or that liberal and idealistic spirit which we can and should advocate every where and exemplify here at home. Still, our altruistic activities must be based on a clear recognition of and respect for the realities, or they will not stand on firm ground or prove either helpful or lasting.

Economic Problems

"The era on which the world is entering will be governed mainly by economic problems of which social problems form an important and inseparable part. In this peaceful but strenuous commercial strife, the best interpretation of a nation's success will lie in abundant and well paid employment for its people, and in its ability to adjust its affairs so as to strike a fair balance between the rigid requirements of sound economics, the promotion of trade, and the stimulation of enterprise on the one hand, and the dictates of social justice, and the genuine welfare and contentment of the masses of its people on the other. Much can be done to contribute to this desirable result in our own beloved land, and by just such men as are here gathered.

"An intelligent conception of the true situation, a broad and sympathetic attitude, a readiness to be used in the creation of sound public opinion, or even to take an active part when called to do so—these are the obligations resting on every conscientious, country-loving business man and citizen."

Other speakers included Dr. Hugh P. Baker, Secretary-Treasurer of the American Pulp and Paper Association and Allen Curtis, of the International Paper Company.

Mills Visited

The next day was given over to visiting mills in the Hudson River Valley. Automobiles left promptly at 9:00 A. M. for optional visits to the Hudson River mill of the International Paper Company at Corinth, or Finch, Pruyn and Company's mills at Glens Falls. These visits were very instructive.

At 2:30 P. M. both parties met in Glens Falls for luncheon, which was served in the Parish House as guests of the Hudson Valley Manufacturers. Visits were then made to the Sandy Hill Iron and Brass Works and the bag factory and Fenimore mill of the Union Bag and Paper Corporation.

Lake George Trip

The membership then departed for an automobile tour along the shores of Lake George. The weather was ideal. The steamer "Horicon" was chartered for the evening, and the members and guests boarded for a moonlight excursion on the lake. The band of the

Union Bag and Paper Corporation furnished the music, and a buffet luncheon and other refreshments were served on the boat. Conspicuous was the fact that all attractions and modes of travel were complimentary for the guests and members.

Visit General Electric Plant

On Friday morning, the automobiles left for a trip to Schenectady, to visit the plant of the General Electric Company of that city. This great plant resembles a city in population. Among the buildings visited, was the one in which the large turbines are manufactured. This building has the largest machine shop in the world, having a floor area of 502,895 square feet. It is devoted largely to the manufacture of Curtis Steam Turbines, and in it, are some of the largest planers, boring machines, and centering machines ever built.

It is an interesting fact that paper salvaged during the course of the year in this plant would equal in weight the amount required for printing a daily sixteen page paper of fifty thousand circulation for two and one-half months. The number of people employed in this immense plant is approximately twenty-four thousand, and the total floor area is approximately 6,200,000 feet.

Albany Felt Mills Visited

The party next boarded trolley cars for Albany, where optional visits were made to the felt mills of the Albany Felt Company and F. C. Huyck and Son's Company.

The Committee of Arrangements consisted of Charles F. Rhodes, Chairman, International Paper Company, Glens Falls, New York; George S. Witham, Jr., Union Bag and Paper Corporation, Hudson Falls, New York; C. A. Woodcock, Finch, Pruyn and Company, Glens Falls, New York; Archie J. Kennedy, Sandy Hill Iron and Brass Works, Hudson Falls, New York; W. W. Cronkhite, General Electric Company, Schenectady, New York; Frank T. E. Sisson, Racquette River Paper Company, Potsdam, New York, and Sanford M. Hall, American Pulp Stone Company, Saratoga Springs, New York.

Among those who attended the fall meeting were the following:

C. K. Andrews, Grand Rapids, Minn.; C. H. Allen, Glens Falls, N. Y.; R. A. Andrews, Parian, N. J.; Edward B. Ashton, president Chamber of Commerce, Saratoga Springs; W. H. Artz, Pittsburgh, Pa.; George R. Atkinson, Philadelphia; M. M. Avery, Hudson Falls, N. Y.; C. C. Batchelder, Argentina; B. Branch, Toronto, Canada; Hugh P. Baker, New York City; Francis L. Barstow, Fitchburg, Mass.; O. L. Berger, New York City; George B. Begnal, Saratoga Springs; P. T. Baird, Spokane, Wash.; H. A. Berger, New York City; Alf Brecke, New York City; H. H. Brown, Maine; H. C. Busser, York Haven, Pa.; F. C. Boyce, Wausau, Wis.; W. E. B. Baker, York Haven, Pa.; George B. Bearce, Ohio; F. L. Becker, East Walpole, Mass.; William M. Bovard, Springfield, Mass.; F. H. Bendig, Philadelphia; Ralph L. Bosworth, Holyoke, Mass.; A. A. Buch, Pittsfield, Mass.; W. Noyes Baker, Glens Falls, N. Y.; H. C. Barbour, Elyria, Ohio; J. S. C. Baily, New York City; J. B. Baron, Watertown, N. Y.; George U. Burr, Hudson Falls, N. Y.; R. A. Buckley, Glens Falls, N. Y.; Fred H. Baker, Saratoga Springs, N. Y.; Lawrence F. Barsaloux, Hudson Falls, N. Y.; W. W. Cronkhite, Albany, N. Y.; William Clark, Boston, Mass.; F. C. Clark, Holyoke, Mass.; Norman Clark, Nashua, N. H.; John S. Collins, Holyoke, Mass.; J. Cornell, New York City; F. A. Curtis, Washington, D. C.; Edward T. A. Coughlin, Kalamazoo, Mich.; M. Cline, Glens Falls, N. Y.; C. E. Curran, Dayton, Ohio; H. P. Carruth, Ohio; F. E. Cuddeback, Syracuse, N. Y.; T. Tinsey Crossley, Toronto, Canada; A. T. Costigane, Toronto, Canada; H. T. Cornell, Hudson Falls, N. Y.; Charles M. Carrier, Millinocket, Me.; Gilbert L. Clark, Lee, Mass.; A. D. Carrier, Mechanicville, N. Y.; A. H. Clark, Toronto, Canada; H. P. Cornell, Toronto; J. J. Case, Saratoga Springs, N. Y.; Clinton V. Cassiday, New York City; W. B. Curtis, Glens Falls, N. Y.; F. B. Chapman, D. H. Cowles, B. C. Cruickshank, Washington, D. C.; George Carruthers, Toronto; J. A. De Cew, New York City; J. R. Dufford, Passaic, N. J.; W. J. Deery, Philadelphia; Niel E. Daggett, Hudson Falls, N. Y.; W. H. Dickerson, New York City; Theodore Dunn, Detroit, Mich.; A. Scott Dowd, Chicago, Ill.; A. B. C. Drew, New Bedford, Mass.; L. C. Daniels, Boston; L. J. Deane, Saratoga Springs, N. Y.; James Dunn, William Davidson, Philips Dennett, East Walpole, Mass.; H. K. Davies, New York City; W. L. R. Emmett, Schenectady; S. D. Elison, New York City; G. E. Enigh, York Haven, Pa.; T. L. Edmonds, Wausau, Wis.; Henry E. Fletcher, Alpena, Mich.; E. B. Finn, Hudson Falls, N. Y.; C. A. Fourness, Neenah, Wis.; James Foxgrover, Kalamazoo, Mich.; P. K. Fletcher, Alpena, Mich.; William Fox, J. J. Forbes, P. H. Glattfelter, Spring Grove, Pa.; I. Gordon, Barrington, Mass.; J. T. Gibbons, Ayer, Mass.; Percy Gooding, Bangor, Me.; T. R. Gibson, Hudson Falls, N. Y.; W. D. Gregor, Fulton, N. Y.; L. H. Goebel, New York City; C. Nelson Gain, Toronto, Canada; H. W. Guettlet, Chicago; O. P. Gephart, Ohio; E. G. Godshalk, Hudson Falls, N. Y.; Arthur B. Green, Erie, Pa.; Sanford M. Hall, Saratoga Springs, N. Y.; Frank E. Harper, Framingham, Mass.; Clarence T. Hamill, Boston, Mass.; H. Holden, Fitchburg, Mass.; R. O. Harper, Barrington, Mass.; R. S. Hatch, Garfield, N. Y.; Charles H. Hill, Holyoke, Mass.; L. L. Hebberd, Chicago, Ill.; Edward Hutchins, New York City; F. R. Hyatt, Glens Falls, N. Y.; James H. Haines, Glens Falls, N. Y.; C. L. Higgins, Glens Falls, N. Y.; J. A. Hedgosch, Dayton, Ohio; G. W. Hoey, Canaan, Vt.; C. W. Higley, W. H. Hill, Fort Edward, N. Y.; J. P. Harsha, P. L. Houston, Washington, D. C.; George H. Harvey, Middletown, Ohio; W. O. Johnson, Woronoco, Mass.; J. O. Jenssen, New York City; Charles A. Junken, New York City; J. D. James, Saratoga, Springs, N. Y.; E. T. Jones, Greenwich, N. Y.; C. A. Jobson, York Haven, Pa.; J. C. K. Jordan, New York City; S. W. Jacobs, New York City; R. S. Kellogg, New York City; A. J. Kennedy, Hudson Falls, N. Y.; F. C. Kennedy, Hudson Falls, N. Y.; C. H. Kent, Holyoke, Mass.; C. H. Kephart, York Haven, Pa.; M. A. Keimmel, Erie, Pa.; K. T. King, Chicago, Ill.; C. E. Kinney, Georgia; L. F. Kinney, Hudson Falls, N. Y.; Thomas J. Keenan, New York City; E. P. Lowe, Pittsburg, Mass.; B. T. Larrabee, Cumberland Mills, Me.; H. Liebeck, Chester, Pa.; R. H. Laftman, Bogalusa; H. H. Latimer, Hamilton, Ohio; R. E. Lofton, Washington, D. C.; J. Leonard, J. M. Lamontagne, New York City; W. L. Merrill, Schenectady, N. Y.; W. S. McClellan, Spring Grove, Pa.; L. W. Mahle, Rittman, Ohio; A. Y. Meeker, New York; J. H. Miller, Stephens Point, Wis.; W. D. Mooney, Glens Falls, N. Y.; Clarke Marion, Hamilton, Ohio; H. G. McDowell, Wilmington, Del.; J. P. Mendel, Wellsburg, Va.; O. J. Mills, Glens Falls, N. Y.; Charles McDowell, Philadelphia; C. R. McDonald, Middletown, Ohio; C. R. McMillen, New York City; H. A. Morrison, New York City; E. K. Mansfield, New York City; C. S. Morse, Glens Falls, N. Y.; F. L. Moore, Glens Falls, N. Y.; J. L. Murrey, Hudson Falls, N. Y.; Donald McLennan, Frank J. McGovern, Albany, N. Y.; D. T. McConnell, W. E. Metray, Hudson Falls, N. Y.; William D. Marshall, Philadelphia; W. N. McFadden, Johnsonberg, Pa.; W. L. Nixon, Holyoke, Mass.; E. A. Nelson, Hudson Falls, N. Y.; W. A. Nivling, Boston; Milton A. Neubauer, Mechanicville, N. Y.; J. F. Nesbitt, Hudson Falls, N. Y.; J. J. O'Conner, Chillicothe, Ohio; J. E. O'Connell, Newton Falls, N. Y.; William Ostrandes, Saratoga Springs, N. Y.; O. M. Porter, New York City; H. L. Peckham, Erie, Pa.; R. K. Pratt, Glens Falls, N. Y.; G. J. Peet, New York City; L. J. Parent, Woodland, Me.; Preston Paris, Hudson Falls, N. Y.; A. Partington, Greenwich, N. Y.; R. W. Pryor, Jr., New York City; Samuel Pruym, Glens Falls, N. Y.; J. D. Petteys, Albany, N. Y.; W. S. Rooney, Albany, N. Y.; C. F. Rhodes, Glens Falls, N. Y.; E. S. Redman, Bangor, Me.; H. A. Rothchild, Kimberly, Wis.; J. D. Rue, Dayton, Ohio; E. O. Reed, Washington, D. C.; E. A. Rees, Albany, N. Y.; A. F. Richter, Watertown, N. Y.; H. W. Rogers, Schenectady, N. Y.; J. A. Ross, Providence, R. I.; C. W. Reade, Wisconsin; G. K. Spence, Johnsonberg, Pa.; R. W. Steins, Ontario; S. Schultz, E. Stutermeister, Cumberland Mills, Me.; T. Safford, Potsdam, N. Y.; J. Stevens, Boston; E. Stafford, Boston; S. Staege, Pittsburgh, Pa.; F. T. Sisson, Potsdam; J. L Sensenbrenner, Kimberly, Wis.; L. M. Start, Massachusetts; T. H. Savery, Jr., Chicago; J. N. Stephenson, Montreal; H. J. Skinner, C. F. Sammet, Dalton, Mass.; H. B. and J. C. Schmidt,

York, Pa.; B. H. C. Smith, Chillicothe, Ohio; A. F. Smith, Cincinnati, Ohio; S. E. Seaman, Hopewell, Vt.; H. Shipman, Canada; C. R. Scaborne, Wisconsin; G. F. Shevlin, Glens Falls, N. Y.; J. W. Schwenn, Schenectady, N. Y.; A. W. Sherman, J. C. Standart, Albany; G. W. Sisson, Jr., Potsdam, N. Y.; J. E. Scott, Schenectady, N. Y.; H. R. Snyder, Albany, N. Y.; George W. Stainby, Glens Falls, N. Y.; E. C. Tucker, Holyoke, Mass.; H. H. Taylor, Dayton, Ohio; E. J. Trimbey, Glens Falls, N. Y.; C. R. Tait, Erie, Pa.; W. C. Tibbitts, Glens Falls, N. Y.; J. Townsend, Mechanicville, N. Y.; B. E. Teale, Lee, Mass.; K. Uyeda, Japan; J. H. Vail, Hudson Falls, N. Y.; F. M. Williams, Watertown, N. Y.; J. M. Wade, Boston, Mass.; Tom, C. C. and L. A. Waldon, New York City; G. G. Williamson, Mittineague, Mass.; G. S. Witham, Sr., Hudson Falls, N. Y.; G. S. Witham, Jr., Hudson Falls, N. Y.; Victor Wichum, New York City; G. R. Ware, New York City; M. P. Winchell, Jr., New York City; C. A. Woodcock, Glens Falls, N. Y.; L. G. Willson, Glens Falls, N. Y.; B. Wahl, Detroit, Mich.; E. Wright, Shataugay, N. Y.; C. F. Wayte, Syracuse, N. Y.; J. B. Woodruff, Holyoke, Mass.; L. R Wood, Michigan; R. H. Winegard, Hudson Falls, N. Y.; G. K. Walker, Glens Falls, N. Y.; D. M. J. Weed, Buffalo, N. Y.; E. M. Yoerg, South Hadley Falls, N. Y.; Paul Zilske, Detroit, Mich.

An Automatic Continuous Mixing System for Paper Stock

By EDWARD J. TRIMBEY

Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, on September 1, 1920, at Saratoga Springs, N. Y.

IN THE manufacture of newsprint paper, beating or drawing out the fibers is unnecessary. While beaters are still used in many mills making newsprint, they are used merely for mixing the ingredients, or for breaking up the sheets of pulp where either the groundwood or the sulphite, or both, are used in lap form.

In the larger and more modern mills both groundwood and sulphite are furnished in the form of soft stock, and present practice is to use mixing tanks in place of beaters. The process of supplying two or more paper machines making the same grade of paper, from a common source of relatively large capacity which is in turn supplied from mixing tanks, is the invention of Warren Curtis, jr., and while it seems to be not generally known, this process is fully covered by patents. It is applied in several ways; in most cases, an agitator is used for mixing the stock and other ingredients, though in some installations the stock is mixed by means of a pump which draws the stock from the bottom of the tank and delivers it tangentially into the top of the tank, thereby agitating and mixing the mass. It is pumped around until it is sufficiently mixed, when the valves are changed and the mixture is sent over to the jordan chests by the same pump.

As compared with a beater system, the mixing tank system has marked advantages, as its use resulted in savings in first cost, floor space, power and labor, though an equipment of mixing tanks for a 200-ton mill would require floor space of about 500 sq. ft. on two floors, 100 H. P. or more for the pumps and agitators, and one to two men per tour.

During the past year there has been in operation in one of the largest newsprint mills in the world an automatic continuous mixing system which is continuous as against intermittent in action, is automatic in its operation and control, and which with regard to further savings in floor space, power, labor and upkeep is as great an advance over the intermittent mixing tank system now in use as they were over the old beater systems. In addition, it has advantages as regards uniformity of furnish and accuracy of control of proportions which can not be duplicated with any of the other systems now in use, not excepting the expensive method of taking off all pulp in laps and weighing the amounts of groundwood and sulphite furnished to each beater.

Groundwood and sulphite are furnished continuously, either by gravity or by pumping, to their respective compartments of a double vat; each compartment is provided with an overflow dam and a float valve of special design, for maintaining a constant level in the compartment regardless of the rate of flow of stock. Mounted in one end of this double vat is an outlet spout communicating with both the groundwood and the sulphite compartments, and so arranged with a separating partition and an adjustable top that the cross sectional areas for the outflow of groundwood and sulphite will give the desired proportions of each, and at the same time the total flow can be varied to meet the changing requirements of the paper machines. This separating partition can be locked in any position without interfering with the movements of the adjustable top, and thus maintains a constant percentage of sulphite; it can readily be adjusted to give any other percentage if desired, and the adjustable top is automatically raised and lowered to deliver sufficient total stock to maintain a constant level in the machine chests.

In addition to being adjustable for both total volume flow and relative proportions of groundwood and sulphite, this outlet spout has valuable regulating features which automatically compensate for minor variations in the consistency of each. When soft stock flows through a pipe or spout under the influence of a given head, it will attain a certain velocity which is much less than that of water under similar conditions, as it meets with considerable frictional resistance; if the consistency increases, the frictional resistance will also increase and since the "head" remains constant this necessarily results in a de-

crease in velocity. It can readily be seen that by proper design the decrease in velocity can be made to counterbalance the increase in consistency so that within a given consistency range there will be a constant rate of discharge of dry stock per unit of time. It is expected that the stock coming to the vats of the continuous mixing system will be controlled by consistency regulators, but this automatic compensating feature is of value as a second control to smooth off temporary variations and to act in cases of emergency.

Supply of Clay, Color and Alum Controlled

The other ingredients, clay, color and alum are supplied in solution or in liquid form to receiving vats in which a definite head is maintained by means of overflow dams. In the bottom of each vat is an orifice in brass plate. This orifice being of a fixed area and under a constant head discharges a constant quantity into a second vat beneath, which is provided with a double overflow weir having a separator between the two weirs, an arrangement similar to that used in some stuff boxes. The discharge from one weir goes into the mixture of groundwood and sulphite, and that from the other weir joins the overflow from the upper vat and is returned to its supply tank. The separator between the two weirs is mechanically connected to the mechanism for raising and lowering the adjustable top of the stock spouts for groundwood and sulphite in such a way that when the pulp discharge ports are closed, the weir discharging into the pulp mixture is also closed and the liquid all goes out at the overflow. As the stock ports open, the separator is automatically shifted to keep the length of the weir always proportional to the area of the stock ports. In this way clay, color and alum are always added in the right proportions. Suitable means are provided for readily increasing or decreasing the percentage of any one of these ingredients as desired without changing the others.

A double ratchet wheel of improved design operates the gears which are employed for raising and lowering the adjustable top of the stock spouts, with suitable means for limiting the travel. The pawl operating this ratchet wheel is engaged by means of a solenoid energized through contacts connected to a float in the chest supplying the machines. If sufficient stock is not being furnished by the mixing system, the chest level in the machine chest will drop, contact will be broken and the pawl will engage with the ratchet to raise the adjustable top and thus increase the areas of the outlet ports for groundwood and sulphite, increasing the flow. If the level in the machine chests is too high, the reverse action takes place. In this way, we have an automatic stock-tender. Increasing or decreasing the flow of groundwood and sulphite at the same time increases or decreases the amount of clay, color and alum as one master controller operates all the control gates. All the ingredients are thoroughly and intimately mixed by the interference of stream lines as they flow together continuously.

This gives a system which operates without a regular attendant, exact proportions of clay, color and alum are added regardless of the total flow of stock, and exact proportions of groundwood and sulphite are maintained regardless of either the rate of flow or of minor variations in consistency; the first consideration is something of which one can not be certain when depending on a helper to draw groundwood and sulphite to a "mark" on the side of the mixing tank, and the second can not be secured with any of the present mixing systems.

To illustrate the reduction in floor space required with this continuous mixing system as compared with either beaters or mixing tanks, the overall dimensions of an equipment for a capacity of 300 tons of paper per day will be 9 ft. by 6 ft. by 5 ft. high, with a mixing compartment extending 30 in. beneath the floor. As to power, the only requirement is a 1 H. P. motor to operate the controls; and as to labor, no regular attendant is required; there is a considerable saving in maintenance cost, and smaller pumps can be used for supplying groundwood and sulphite, since the stock flow is continuous, the amount to be handled per unit of time is not nearly as great as with an intermittent system where the beaters or mixing tanks must be filled quickly.

With this continuous mixing system the uncertain manual control of stock proportions is replaced by an accurate mechanical means, thus insuring a more uniform furnish, better quality at less cost, and better operating conditions on the paper machines.

Adapted to Board Mills

This continuous mixing system is not limited to newsprint mills alone, but can be adapted to board mills using old papers where the stock is first pulped and then washed and thickened, and the beaters are now used only to provide a means of adding filler, color, alum and size. In any mill where the furnish is entirely in the form of soft stock, or where it can be reduced to soft stock by means of a pulper or shredder, and it is necessary to add definite amounts of chemicals or liquids, this provides a very compact, accurate and economical means of so doing. In many mills, the mixture can be supplied by gravity directly from the continuous mixer to the jordans and thence to the machine chests, eliminating the use of the jordan pumps and chests with a further saving in power and upkeep; at the same time, by uniting the former jordan and machine chests the full storage capacity is retained.

"Wealth depends upon production. Production depends upon efficiency. Efficiency depends upon health. All depends upon Safety," says the National Safety Council.

Power Plant Management

Mechanical Stokers—Part I

By ROBERT JUNE, M. E.

This is the sixth in a series of articles, by Mr. June, on Power Plant Problems. Succeeding articles deal with principles of heat absorption, coal and ash handling equipment, storage of coal, abuse of steam, etc. Later articles sum up the best current practice in the business management of the power plant. The series is of timely interest and should prove of value to our readers.—Editor.

STOKER-FIRED furnaces have many advantages over hand-firing, but where a stoker installation is contemplated, there are many features to be considered. It is true that the stokers feed coal to the fire automatically, but if the coal has first to be fed to the stoker hopper by hand, its automatic advantage is lost. This is as true of the removal of ash from a stoker. In a general way, it may be stated that a stoker installation is not advantageous, except possibly for diminishing smoke, unless the automatic feature is carried to the handling of the coal and ash, as where coal and ash handling apparatus is not installed, there is no saving of labor. In large plants, however, stokers used in conjunction with modern methods of coal storage, and coal and ash handling, make possible a large labor saving. In small plants, the labor saving for stokers over hand-fired furnaces, is negligible, and the expense of installation is no less proportionately than in large plants. Stokers are, therefore, advisable in small plants only where the saving in fuel will be large, or where the smoke question is important.

Interest on investment, repairs, depreciation and steam required for blast and stoker drive, must all be considered. The upkeep cost will, in general, be higher than for hand-fired furnaces. Stokers, however, make possible the use of cheaper fuels with as high or higher economy than is obtainable under operating conditions in hand-fired furnaces, with a better grade of fuel. The better efficiency obtainable with a good stoker is due to more even and continuous firing, as against the intermittent firing of the hand-fired furnaces; constant air supply, as against a variation in this supply, to meet varying furnace conditions in hand-fired furnaces; and doing away, to a certain extent, with the necessity of working the fires.

Why Stokers Are Efficient

Mechanical stokers, as a class, are more effective in preventing smoke than hand-firing, for the reason that their continuous action is productive of uniform development of the volatile gases. Where stokers feed irregularly, the effect is identical with hand-firing, and it is necessary, not only to employ an auxiliary mixing apparatus, but also to furnish at times an extra supply of air, by means of a fan or otherwise, to take care of the enormous volume of volatile gas evolved after a fresh charge of fuel is added. It follows that, for periods of light load, the stoker engine should be throttled down to the lowest possible speed, rather than to be started and stopped intermittently.

The high efficiency of mechanical stokers is due to: (1) Uniformity of feed; (2) Proper proportion of air and combustible; (3) Absence of excessive air dilution, as when the fire doors are opened in connection with hand-firing; (4) Self-cleaning grates.

There is a tendency in all stokers to cause a loss of some good fuel through siftings to the ash-pit, and suitable arrangements should be made to reclaim this.

Just as with hand firing, daily records are essential with any type of stoker, if the most economical results are to be obtained. Only by frequent observation, is it possible to determine the proper adjustment of air supply, depth of fire, and rate of feed. Don't leave the determination of these items to your fireman's casual guess. The best engineer you can get—in or out of your plant—is the cheapest man to standardize your firing practice.

And once he has formulated standard practice, don't think that all is done, and that you and he can go away and forget your stokers. Ten chances to one, your boiler-room force is constantly changing, and in these days, you have no guarantee that two succeeding shipments of coal will come from the same mine, or that they will be of similar characteristics. Call your engineer back to check up methods and results of firing, every week or two at first. Later, his visits can be cut down to once a month, if conditions warrant, but even with a stable, intelligent and willing boiler-room crew, and uniform coal, the monthly inspection should be rigidly adhered to. Stokers are often condemned by owners as inefficient and inferior to hand-firing, because no particular attention has been paid to them beyond keeping them supplied with coal.

Smoke and Stokers

The stoker is not a cure-all for the smoke evil. It is a decided alleviative in many cases, and an actual specific in many others, but to say that the installation of stokers will eliminate smoke in any and all circumstances, is to ignore evident facts.

There are any number of plants burning a wide variety of fuels in ordinary hand-fired furnaces, in extension furnaces and on automatic stokers, that are operating under service conditions practically without smoke. We know from experience, however, that no plant will operate smokelessly under any and all conditions of service, nor is there a plant in which the degree of smokelessness does not depend upon the operating force.

When fires must be brought up quickly, operatives, in handling certain types of stokers will use their slice bars freely to break up the green portion of the fire. In fact, when a load is suddenly thrown on a station, the steam pressure can often be maintained only in this way, and such use of the slice bar will cause smoke with the very best type of stoker. In a certain plant, using a highly volatile coal, and operating boilers equipped with ordinary hand-fired furnaces, extension hand-fired furnaces and stokers, in which the boilers with the different types of furnaces were on separate stacks, a difference in smoke from the different types of furnaces was apparent at light loads, but when a heavy load was thrown on the plant, all three stacks would smoke to the same extent, and it was impossible to judge which type of furnace was on one or the other of the stacks.

While it is absolutely true, and should at all times be remembered that the question of smokelessness is largely one of degree, and dependent to a much greater extent than is ordinarily appreciated, upon the handling of the fuel and the furnace, by the operators, be these furnaces hand-fired or automatically fired, it is a fact that the best results are obtained with a good stoker, properly operated. The reason for this is, that in practically all stoker installations, there is, as compared with hand-firing, a much longer time for combustion, the volatile gases as they are distilled being acted upon by ignition arches, or other arches before they strike the heating surfaces. In many instances, too, stokers are installed with an extension beyond the boiler front, which gives an added length of travel during which the gases are acted upon by the radiant heat from the ignition or supplementary arches, and here again the long travel gives time for the volatile gases to be properly consumed.

Stokers and Labor

In plants of 2,000 H. P. and over, the installation of mechanical stokers and coal conveyors effects a considerable saving in labor. With smaller plants, interest on investment, depreciation and other items of expense, may make hand-firing more desirable, although it should be noted that there are stoker equipped plants of 300 H. P. which are considered a good investment by their owners.

A stoker of the self-cleaning, slow-running type, requires much less attention than a hand-fired furnace. With hand-firing, one fireman can effectively attend to the water, coal, and ashes of about 200 H. P., or handle coal for 500 H. P., whereas with good automatic stokers, equipped with overhead bunkers and down spouts, he can readily take care of 4,000 H. P.

Types of Stokers

There are three principal types of stokers—chain grate, overfeed and underfeed. In addition, there are several special types, such as down draft and sprinkler. A classification of the best-known American makes follows:

CHAIN GRATES

Babcock & Wilson	McKenzie	Leclede-Christy
Green	Illinois	Westinghouse
Playford		Coxe

OVERFEED

STEP-GRATES *Frontfeed*	STEP-GRATES *Sidefeed*
Roney	Murphy
Wilkinson	Detroit
Acme	Model

UNDERFEED

Jones	Taylor	Westinghouse
American	Riley	Type "E"

DOWN DRAFT

Hawley

SPRINKLER

Swift

Volcan

Chain Grate Stokers

The standard type of chain grate is one of the most popular forms of automatic stokers for burning small sizes of high ash and free-burning bituminous coals (30 to 40 per cent volatile matter and 10 to 20 per cent ash). It is also adapted to lignites and the very high ash coals of the West. With low ash coals at high rates of combustion, the grate is apt to become overheated, and breakage, with attendant high maintenance may result.

The standard chain grate embodies a moving, endless chain of grate bars, mounted on a frame, with provision for the continuous and uniform feeding of coal into the furnace, the fuel and the grate moving together. As usually installed, the surface of the grate is horizontal, though in some designs it is given a slight incline toward the bridge wall. The operations of feeding the coal, carrying it through the progressive stages of combustion, removing the ashes and clinkers, and maintaining a clean grate and free air supply are automatic. The driving mechanism consists of a gear train actuated by ratchet and pawls, the arms carrying the latter, being given a reciprocating motion by an eccentric, mounted on a line shaft. The latter may be driven by any type of engine or motor, and the speed of the grate regulated by varying the stroke of the arm carrying the pawls.

Fuel is fed into the hopper, placed at the front end of the furnace, and the depth of the fuel regulated by a guillotine damper. The front part of the furnace is provided with a flat or slightly inclined ignition

arch, the function of which is obvious. The entire grate and driving mechanism is mounted on a permanent truck and may readily be removed from beneath the boiler. The thickness of the fire and the speed of the grate should be so regulated that when the fuel has reached the end of the grate it will have been completely consumed and incandescent ashes only will be discharged into the pit.

With chain-grate stokers, there may be leakage of air through the coal in the hoppers. In the earlier forms, chain-grates had an objectionable feature, in that the admission of large amounts of excess air at the rear of the furnace through the grates was possible. This objection has been largely overcome in recent models by the use of some such device as the bridge wall water-box and suitable dampers. A distinct advantage of chain grates over other types, is that they can be withdrawn from the furnace for inspection or repairs, without interfering in any way with the boiler setting.

Chain grate stokers in general produce less smoke than either overfeed or underfeed types, due to the fact that there are no cleaning periods necessary. Such periods occur with the latter types of stokers at intervals depending upon the character of the fuel bed and the rate of combustion. With chain grate stokers, the cleaning is continuous and automatic, and no periods occur when smoke will necessarily be produced.

This latter class of stoker is particularly successful in burning low grades of coal running high in ash and volatile matter, which can only be burned with difficulty on the other types.

The standard type of chain grate is not adapted to coking coals on account of the swelling and fusing of the fuel, under the ignition arch. The chain grate may be modified to burn this class of fuel by introducing inclined coking plates immediately under the front of the distillation. This agitation prevents the coal from fusing together, and by the time the fuel reaches the grate proper, it no longer tends to cake.

Characteristics of Individual Chain Grate Stokers

The Illinois Chain Grate Stoker is slightly inclined to the rear, and two-thirds of its active length is covered by a flat suspended combustion arch. Either forced or natural draft may be used. It is provided with a water-back at the bridge wall. A series of hand-operated dampers, just below the upper layer of the traveling links is built into the stoker, and as the load is decreased, a proportionate amount of the chain grate surface can be made inactive, and excess air prevented.

Concerning the operating characteristics of this stoker, the manufacturers state that the grate is particularly adapted to Illinois, Kansas, Iowa, Ohio, Arkansas, Texas and other Middle Western coals, high in ash (22 to 25 per cent). Lower ash coals (10 to 13 per cent) can also be burned. With high-ash coals, a draft of .63 inch over the fire and 1 inch at the damper will burn 42 lb. of coal per sq. ft. of grate surface per hour. The best depth of fuel bed is 5½ to 6 inches. With lower ash coals, the draft over the fire should be approximately .4 inch, when burning the same amount of coal. It has been found that the rate of combustion varies nearly proportionately to the square foot of the draft in the fire box. With the forced draft type of grate the draft over the fire varies from atmospheric pressure to .15 in. water, while pressures in the wind box vary from 1 in. to 4 in. water.

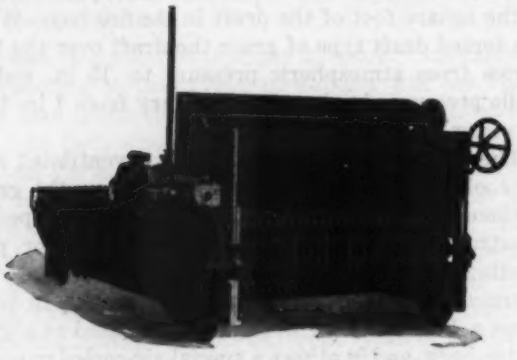
The Playford Chain Grate uses a ventilated and air-cooled flat ignition arch extending over the grate surface at the front of the boiler. Several types of construction are used at the bridge wall for preventing clinker from adhering, and preventing the ingress and leakage of air over the grate. In some cases a 4-in. diameter wrought pipe is used as a fixed water-back, and in others a special air-cooled movable back is installed. A movable water-cooled back can be used, which can be located within 1 in. of the chain grate. The movable feature permits holding the fuel bed on the grate, until it is entirely consumed, and also permits the dumping of large clinker into the ash-pit instead of pulling it out through the inspection door. A water-cooled fuel grate at the front prevents back-firing of the coal in the hopper. Bituminous coals ranging from 25 to 40 per cent volatile, are best adapted. The stoker will develop 150 to 200 per cent of rating continuously with no extra attention. Natural draft is used. For ordinary load .15 to .3 inch draft in the fire box is required, and for the maximum load .25 to 40 in. draft.

The Green Chain Grate type "K" is used for free-burning coals, and type "L" for coking coals. Either natural or forced draft is used with type "L." Type "L" is provided with an inclined apron below the fuel gate, on which the coal is coked before moving out onto the chain. Adjustable flanges on the ledge plates fit against the sides of the upper chain, presenting a durable surface to the moving fuel bed, and preventing air leakage between the chain and the side walls. The Green stoker has a specially designed ventilated flat arch suspended on the bars. In some cases a stationary water-back is used on the bridge wall.

The Green Engineering Company, who make this stoker, says that approximately 10 lb. of coal can be burned per sq. ft. per hour for each .1 inch draft available in the furnace. Combustion rates up to 60 lb. have been obtained but the usual proportion of grate required only 30 to 40 lb. Natural draft is used with the "K" type for free burning coals, and .6 in. drop would be required through the fuel to burn 50 lb. per sq. ft. per hour. Either natural or forced draft is used with "L" type.

The Leclede-Christy Chain Grate—The fuel gate

has no guides and therefore swings against the ignition arch, preventing leakage of air. The side frames have a slight slope toward the rear and bear against the under side of ledge tile, preventing air leakage around the sides of the stoker. These ledge tile are of special abrasive resisting refractory. A stationary baffle between the top and bottom of the chain, suitable wing plates on the side frames, closing the space to the side walls, and a rocking iron plate on the back wall of the dripping pan, in the place of the stationary baffle, prevent air leakage over the end of the stoker below the bridge-wall. The lower side of the chain bears lightly on the iron plate on the dripping pan rear wall. The bridge-wall overhangs the grate to the point where it breaks and rises vertically. This vertical wall reflects heat under the ignition arch with beneficial results. The arch is flat and suspended from a rigid frame. A swinging damper between the upper and lower parts of the chain permits the rendering of the rear 30 per cent of surface inactive.



Babcock and Wilcox Chain Grate Stoker

This stoker is designed for the coal mined west of the Indiana-Ohio line. Eastern coals, to which it is fitted, are free-burning bituminous, such as Youghiogheny, Westmoreland and Pittsburgh. The stoker uses natural gas. With chimneys 175 to 250 feet high, capacities up to 200 to 300 per cent ratings are obtained.

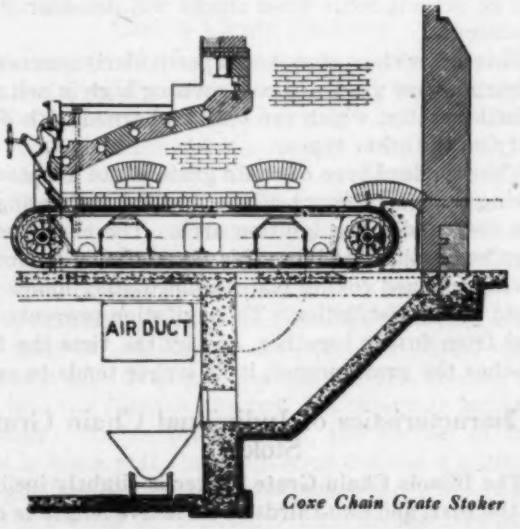
The Babcock and Wilcox Chain Grate Stoker—The side frames are cast iron, and are flush with the top surface of the chain. The inner sides are machined, offering a guide for the side links. On the outer edges are side seals, held by guide bolts which permit a vertical motion. Weighted levers against the under side of the seal plates hold them against the cast iron side plates which are built into the brick walls and overhang the side frames of the stoker. This completely excludes air at the side of the stoker. At the rear of the grate, a structural channel between the top and bottom of the chain, forms a part of an air baffle. Immediately below the chain in the plane of this channel is a steel plate baffle, with a hinged portion extending to the bottom of the ash-pit, completely sealing the rear. A chain connected to the hinged portion is brought to the front of the stoker, by means of which a greater or less amount of air may be admitted to the rear to meet varying conditions of combustion. A water-box in the bridge wall is a part of the standard equipment. It acts as an air seal, limits the thickness of the bed of consumed fuel which may pass under it, and prevents the admission of large quantities of air. The water-box is connected to the circulation of the boiler.

The Westinghouse Chain Grate Stoker is used only with natural draft and with free-burning coals. A minimum draft of .25 in. in the furnace should be available for ordinary purposes, and up to as high as .6 in. for higher capacity. Under favorable fuel, draft and setting conditions, 50 lb. of coal per sq. ft. of grate per hour can be burned.

The Coxe Traveling Grate was originally designed for anthracite rice, but has been developed for any size anthracite, coke breeze and bituminous. It is used only with forced draft. With 2.5 in. pressure in the ash-pit, 150 to 200 per cent load can be carried continuously; 300 per cent is not unusual.

General Instructions for Chain Grate Operation

Generally one operator and one coal passer can handle ten chain grate stokers. Chain grates are usually large in area for the boiler, when compared



Coxe Chain Grate Stoker

with other types of stokers; the normal forcing capacity averaging 260 per cent of boiler rating, with the combustion rate up to 48 lb. per sq. ft. per hour, with coal suitable for the stoker. With low ash coal, this driving would probably cause the grate to become overheated and high maintenance cost would result. To obtain the best operating results, it is essential that the draft be under control and that wide-open and tight-shut positions of the damper be determined and marked, and that dampers operate readily between these positions.

All gate leveling bolts can be adjusted to obtain a

(*Continued on page 878*)

A New Felt Cleaning Device

By C. A. WOODCOCK

Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, on September 1, 1920, at Saratoga Springs, N. Y.

"A NEW felt cleaning device as a means of increasing production" appears to be the text assigned to me. I shall have to ask for the same privilege that was granted to one of the gentlemen who is to speak at the banquet this evening. The Committee on Arrangements, in extending the invitation to him, suggested he take a certain subject as the theme of his remarks, but, owing to the shortness of time that he would have to prepare his remarks, concluded the invitation by telling him that he could talk on, or about, or around, any subject which appealed to him. So, instead of talking only about a new felt cleaning device as a means of increasing paper production, my remarks will be around the subject.

The efficiency of a paper machine as a whole depends upon the proper functioning of its various parts. For those mills that have arrived at a point in paper machine maintenance where it is possible to run, frequently, the various parts of the machine for several consecutive days or a week without the necessity of stopping for repairs, it is obviously essential that, if they are to reach the highest efficiency, they abandon the old methods of operation, which call for frequent stopping of the machines to wash the press felts and screens.

There are screens that have been installed in the last few years, in large numbers, in various mills, of a type that is more or less self-cleansing, that will run the full week through, or longer, without it being necessary to clean them. The Bird screen is well known to be such a type. The other chief cause of lost time on a paper machine is the necessity of stopping production to wash press felts. There has been a great deal of effort expended to avoid this. But a felt-cleaning device of a type that will actually cleanse the felts of paper machines of all types, and which may be employed while the machines are in operation, and without interfering with the continuous production of the regular quality of paper, is no longer a dream but a reality. Thus, the felts may be cleaned as frequently as desired, without interfering with the continuity of the paper manufacturing operation. By keeping the felts in prime condition, water may run through them more freely, permitting the paper to reach the dryers in a more uniformly dried condition, which will allow the regular drying operation to be done with some considerable reduction in the amount of steam necessary to dry.

When the newly formed web of paper approaches the couch rolls from the Fourdrinier part of the machine, its water content is about 87 to 90 per cent. The chief function of the machine from this point on is, therefore, to remove this water, and this, as we all know, is done first by subjecting the web to pressure in the presses and then to heat on the dryers. In removing the water by pressure, the web is supported upon successive woolen felts of different degrees of porosity, depending upon the speed of the machine and the quality of paper to be made. These felts pass over suction boxes and between press rolls and all of the water sucked and squeezed from the web during this treatment must pass through them. For this reason, it is of vital importance that the felts be kept comparatively dry and porous, and continually or frequently freed from small particles of filler and fiber which are held within them as the water filters through. The general practice, as we know, for cleaning the felts of Fourdrinier paper machines is to stop the press part of the machine, slacken the woolen press felts, release the pressure between the press rolls, and apply water to the felts to wash off the accumulations of dirt thereon. This method requires that the machine be put out of the regular manufacturing operation each time the felts are to be cleaned. In the case of most kinds of paper, it is necessary to clean the felts from one to several times a day, involving a drenching of the operatives, damage to the felts, a considerable loss of production during the actual period of washing, and about an equal amount for time lost in straightening out the felts and getting them back to proper tension and alignment, with weights and levers of the presses again in adjustment. Our observation has been that in well regulated mills, the time lost each 24-hour day, incidental to cleansing felts in the old way, is about two hours. That includes the time consumed in disengaging the levers and weights, roping up and turning the felts, washing, getting the felts straightened out again, the weights and levers in proper adjustment, and the felts in proper alignment, the paper back on the reel, and everything so adjusted that saleable paper is being made. There is also time lost from breaks caused by the felts being run more or less dirty before the usual washing-up time comes around.

In applying our felt cleaning device, clear water or a solution of a suitable cleaning substance is supplied on either side of the felt, preferably—for the average mill—the dirty side or that side which comes in contact with the web, to loosen the foreign material deposited thereon. Thereafter a suction effect is applied to the dirty side of the felt to open the meshes and remove the water and material which have been

freed thereby. Water is supplied either directly to the felt by suitable jets, or a better distribution of water may be obtained by applying it to one of the rolls over which the felt passes as it travels through the machine. In any case, the water or cleansing fluid should be applied to the felt a sufficient distance in advance of the point at which the suction is applied to gradually loosen the foreign material so that it may be removed by the suction effect; but this should not be applied so far in advance that it may drain from the felt before the latter is exposed to the suction effect. The suction is applied by means of a suitable suction box movably mounted so that it may be thrown into engagement with the felts during the cleansing period or taken out of operative relation to the felt during the normal operation of the machine, to reduce unnecessary wear on the felts and to prevent the collection of dirt in the vacuum box. The suction box we use has several novel features. It is so constructed that, over the ordinary types, it greatly facilitates the removal of material caught within the meshes of the felt. Also any material scraped off the surface of the felt by the edges of the slots of the box will be drawn through the slots and not accumulate and ultimately obstruct them.

The pipe is supplied with warm water, or other cleansing fluids (which may contain a solution of suitable chemicals for aiding the washing operation). However, on regular news and some hardsized papers, we find it unnecessary to use any other cleansing fluid than warm water. The point at which the water should be supplied depends upon several factors, such as the speed of the machine and the amount of residue deposited upon the felts as determined by the character of paper being produced on the machine. As to the results we have obtained from this felt cleansing device that we developed in our mill about two years ago and which was successfully installed about a year ago on our three Fourdrinier paper machines, which at present are running on newsprint, at speeds from about 650 to 675, permit me to quote from our monthly reports:

Increased Production

Our last monthly report compiled was for July, 1920, showing our machine production and efficiency. This shows that we have increased our production over one year ago 10¾ per cent, and increased our speed 7½ per cent, and efficiency 5¼ per cent over the same period. The average speed for our mill in July, 1919, was 600 ft.; efficiency, 86.9 per cent; pounds produced per inch trim, 696. In July this year the speed was 646; efficiency, 91½ per cent; production per inch trim, 771 pounds. This report is made up on the basis of wrappers being excluded from production.

Our increase in production for July, 1920, over July, 1919, amounted to 75 pounds per inch trim on a 24-hour basis. This resulted in an increase in production of paper for the year of 3,708 tons, on an average trim of 319 inches. The saving from increase in efficiency, which amounted to 5¼ per cent, meant an increase in production of 36 pounds per inch trim on a 24-hour basis. This for the year, based on 319 inches average trim, accounted for 1,625 tons of the increase. To commercialize this increase in production, due to the increase in efficiency of 1,625 tons, say at a profit of $19 per ton (which is the approximate figure that the Federal judges in the newsprint case stated was a fair profit for the mills to make) meant an increased gain for the year on that basis of over $30,000. Then add to that an item for coal saving for 5¼ per cent of the production which went into saleable paper instead of being waste. It would require steam or extra coal to dissolve the broken paper, which would mean an additional saving of $8,000 on the basis of coal costing $7 per ton, and taking about 1,200 lbs. of coal to dissolve a ton of broken paper.

It is quite possible that some of your mills may have taken a little larger profit than the $19 per ton. I thought it safer for illustration for me to use that figure, in these days when the question is such a live one, of what is a fair profit, as $19 per ton has been fixed on by the Federal judges as being a fair one per ton as a margin of profit. Apply this same basis of calculation for a machine having an average trim of 100 in., which we might assume is the average size, this increase in efficiency and saving of coal would amount to about $12,000 per annum.

I have taken the liberty of treating this matter from a commercial point of view, for, as I see it, irrespective of our pet theories, it will surely sooner or later have to be subjected to the commercial test, or the question asked what it will save or permit of gain in the terms of dollars and cents.

Two Paper Manufacturers on Forestry College Board of Trustees

The appointment of C. C. Burns, of the St. Regis Paper Company, Watertown, New York, and Harry P. Gould, of Lyons Falls, New York, to the Board of Trustees of the New York State College of Forestry at Syracuse has caused the deepest expression of approval from the newspapers of that state.

The Watertown Times, voicing an expression of the interest of forestry in the paper industry, says in part:

"Both men are well qualified for their duties. Mr. Burns has made a study of the forestry problem both in the United States and Canada. He understands the forestry problems of the state as well as any man. Mr. Gould has been connected with the paper industry all his life, and is deeply interested in forest supply and reforestation. He owns extensive timber tracts, and is well equipped to give his experience and knowledge to this state institution."

Storage of Pulp Wood and Wood Pulp

By W. A. MUNRO

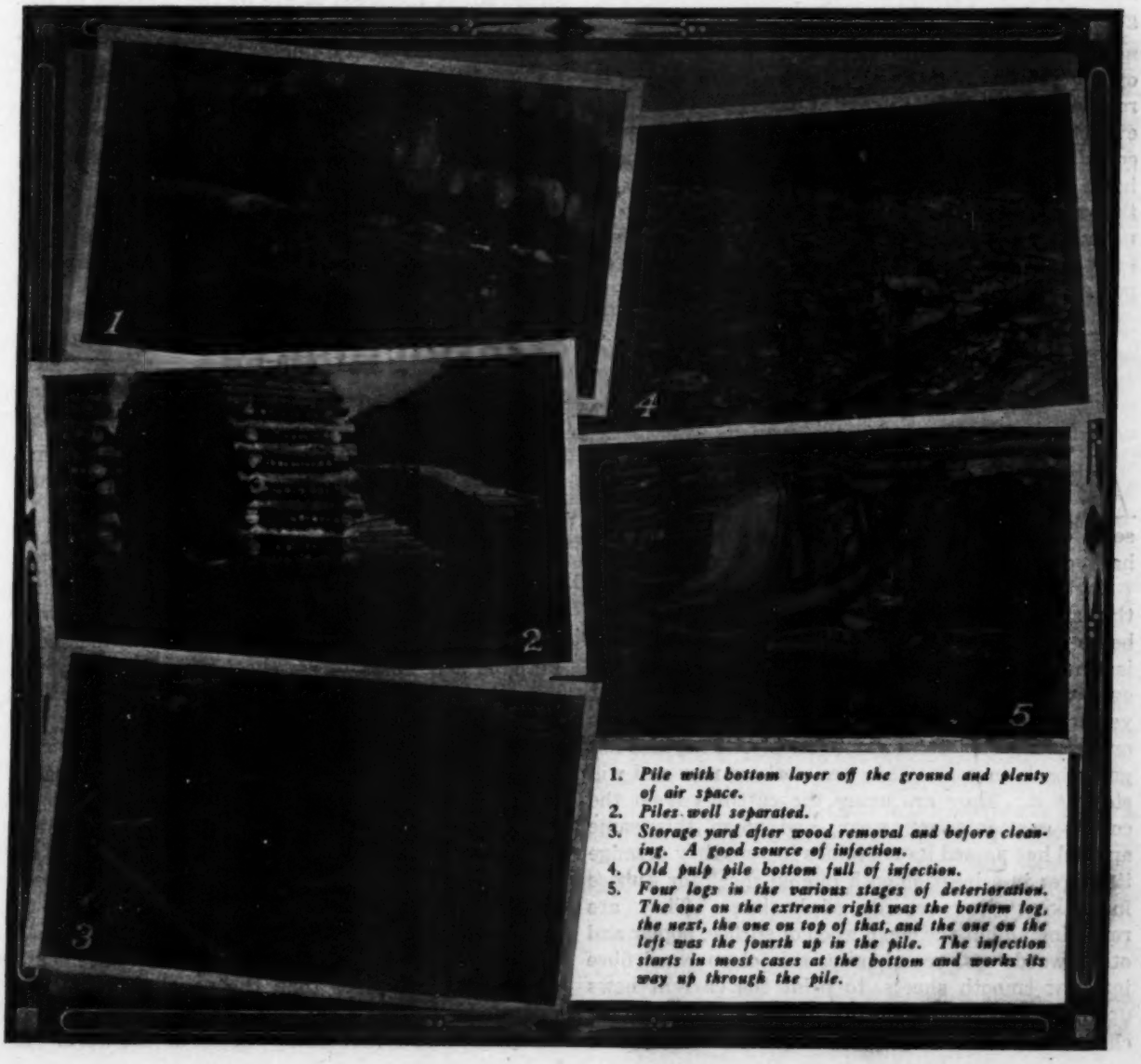
PLAIN sanitation and care in storing applied to both a pulp wood and wood pulp pile will almost entirely remove the danger of loss through the action of fungi and red rot.

Before any new wood is piled on the yard, the bottom should be thoroughly cleaned of bark, rubbish, and infected pieces of wood, and this clean space sprayed with a weak tannic acid solution. This will kill any of the dormant spores of the fungus that have fallen off when the wood was moved, and prevent the infection of the new sound wood.

With piles of two foot wood, no other precautions, except keeping the new wood separate from the old as far as possible, can be taken. However, in the case of wood of 4, 8 or 16 ft. length, piled in racks or skids, greater care can be taken and the chance of losing any appreciable amount of wood by infection can be greatly lessened.

For piling wood on skids, those made of concrete are preferable. They are permanent, wholly free from infection, and their higher first cost is soon made up by their freedom from upkeep and maintenance costs.

If wood skids are to be used, it is advisable to treat them with creosote, which will not only double their life by checking rot, caused by dampness and dry-



1. *Pile with bottom layer off the ground and plenty of air space.*
2. *Piles well separated.*
3. *Storage yard after wood removal and before cleaning. A good source of infection.*
4. *Old pulp pile bottom full of infection.*
5. *Four logs in the various stages of deterioration. The one on the extreme right was the bottom log, the next, the one on top of that, and the one on the left was the fourth up in the pile. The infection starts in most cases at the bottom and works its way up through the pile.*

ing out, but will also prevent the fungus from growing in the skid and become a source of future infection.

The skids should be large enough to keep the bottom layer of the wood pile well off the ground to allow for the circulation of a current of air through the bottom of the pile.

The storage yard should drain itself readily and no pools of water should be given a chance to form around the base of the piles. This alternate wetting and drying out of the lower layers of the wood is the most active stimulus to the growth of wood fungus, and to the subsequent deterioration of the pulp wood in the pile.

The piles on the yard should be at least six feet apart, and if possible should run in the direction of the prevailing wind in the locality. This arrangement secures the maximum evenness in drying and makes the whole pile uniform in ability to withstand germ attack.

Under no consideration should new wood be piled on the old, and if infected wood from the woods is received, it is better to use it at once, provided, however, the wood already in the storage yard is in good condition. Wood that has been infected in the woods has a very high rate of deterioration when piled on the yard, and is a source of infection for sound wood, no matter how carefully it is handled. The yield from wood that has been infected three months is ten per cent less than the yield from sound wood, and after a season's storage the loss in yield will amount to twenty-five per cent.

Lapped pulp stock made from infected wood should be used as soon as possible; if conditions will not allow it, the laps should be piled by themselves or on the top of other piles with a layer of dryer felt between the infected and clean pulp. The piles of stock made from infected wood should not be of considerable depth or subject to much pressure. They should be free from air pockets where stagnant, moist air would lodge and stimulate the germ growth. The bottom should be cleaned of all old pulp and rubbish and sprayed with the same antiseptic as is used in the wood yard.

A concrete floor for the storage pile would insure cleanliness at the bottom, where the greater part of the fungus action starts and where it does the most damage to the stored pulp. This concrete floor should be provided with a drain, so that the water which is forced out of the lower layers by the pressure of the pile would have a chance to escape easily and allow the bottom laps to dry quicker.

Considerable attention has been given recently to the idea of spraying each lap as it forms on the wet machine roll with a germ destroying solution and in this manner killing all fungi present in the pulp before it is stored. This would be the safest method, although more expensive, and would reduce the likelihood of the stock becoming infected, provided all sources of infection had been removed from the space intended to be used as storage.

The Hustling Papermaker

By M. M. KILEY

AT THE close of the coming month, no further supply of paper may be available. Thereafter, your business records must be kept on some other material. You may use wood, or birch bark, or whatever else you can get, but no paper.

Perhaps you can still feel the alarm arising from that statement. You want to know why there is to be no paper. You can't get along without it. That is true, and there are millions of all kinds of people everywhere to whom it is just as essential. All of you together make the demand that our paper mills are working day and night to supply. They are not going back on you. They are working now and will stay at it. They are using the cuttings from the cotton garments you wear, and when this same apparel has passed its usefulnes to you, they arrange its fibres in a light smooth pliable sheet for service in making your records of business. They are removing all but the clean wood of spruce, poplar and other woods and rearranging this clean wood fibre into flat smooth sheets, to print the current news upon, and with elaborate machinery and the help of chemical solvents they wash away from the chips of other clean spruce logs all but the fibre itself and from this they make durable sheets of paper that cost you less than sheets made from cotton.

It was not always so. Going back a few score of years, paper was made from white rags only. If that were so today, the false alarm of our opening paragraph might well be true. You might as well expect a supply of birch bark to fill the demand. Perhaps you would buy a sheet now and then, but you would balk at the price. Besides, you could have no guarantee that this paper would meet your requirements. If you wanted it for writing purposes it might do very well, but for the many exacting services expected of paper today, it takes ingenious blends of soft and hard fibres, long and short ones, fibres cut sharply or bruised into brushes on their ends, fibres loosely felted or closely formed, and many other modifications that are necessary to make paper do what is wanted of it. Every new use for paper inspires another. When the requirements asked of it are more than the usual papermaking procedure supplies, then work begins in earnest. A man's unaided senses alone will not do the work. It

takes microscopes and delicate balances and accurately standardized process materials, and people who know how to use them. That is why paper companies employ chemists, engineers, microscopists, and specialists who have learned to see the things the untrained man passes by. Each one may think he is the most important link in the chain, but it is a great chain nevertheless, and holds paper up to your requirements.

1200 Feet a Minute

Here is the evidence. Remember, now, that paper only a few decades ago meant a sheet of fibres from rags, bleached and beaten, and built into a sheet sized or made impenetrable to ink under ordinary conditions of service, by incorporated rosin compounds and a surface bath of dilute gelatine from hides. A machine making such a sheet at the rate of 100 ft. a minute and about 7 ft. in width was a marvel in those days. Today the paper for the daily news is made on machines about 14 ft. wide running 500 ft. a minute, and they use no rag stock. A speed of 1,200 ft. a minute is anticipated from a machine now under construction. Figure this out for yourself and learn why your town does not have to depend upon the town crier method for distributing current events any more.

When you arrive at the office in the morning, your correspondence may come first. Perhaps most of it is on bond paper, made for appearance and strength. One large company alone has some 2,000 special watermarks or trademarks for bonds. Perhaps of those 2,000 there are three or four grades that the ordinary business man could distinguish for quality without the mark and the reputation of that particular brand to go by. At the most, there are no more than five clearly separated grades anyway. Those five have been watermarked with their guaranteed quality stated in the sheet and you can choose with your eyes open. If you want all rag paper, you can be sure that you will get it. If you know that paper made from all sulphite wood pulp will do your work, then you can buy that. If fifty-fifty will fill the conditions best, then there is a grade marked for your convenience that is fifty-fifty on the level. Maybe you have grown fond of a certain bond and do not care to change. The chances are that you are curious to know how it matches up with some of the others. One of the largest paper companies will make an analysis of your paper with all identifying marks cut out if you wish, so that you can know how it compares with the other fellow's purchase, and will charge you nothing for the service.

Perhaps there are catalogues to go out in the mail. The paper in your catalogue may have done service in part before, and be none the worse off for its reincarnation. Paper of rag or chemically prepared wood pulp may have lost usefulness after it has carried its message, but the fibre hasn't. The proper treatment with steam and washing soda and lots of clean water with a final light bleach will make the fibre ready for paper again. If you burn old paper or magazines, that means so much fibre gone out of circulation. Keep it in. Sell it back to the old paper dealer and keep the price of paper down. That saving may enable you to put your advertisements into the hands of a hundred more potential customers.

If your catalogue lacks the clean-cut appearance of your competitors, then you are in for a bad introduction. The first thing is the paper. The refinement of the best printing done depends upon special papers termed overlay, medio board, offset and others.

Special Papers

Fitting paper to delicate requirements often has to begin on the cut and try principle, but the characteristics that make it right are readily duplicated by the modern papermaker with the engineer, the chemist and their knowledge and instruments. Paper too absorbent for writing purposes may do well for mimeograph printing, or thin paper that would make good typewriter copies may be too transparent for book purposes. Hard finished or hard sized paper that may make beautiful letterheads may be too hard to stick down the flaps of the envelopes that go with it. Paper with a surface too soft may pick off and put fuzz on the printer's plates, making his work imperfect. Paper is being developed impervious enough to water so that it will keep you dry from the rain, and it is impregnated with waterproofing substances to do this. On the other extreme is the paper made of crystal water and pure white rags only, so that you may have celluloid that has the appearance of ivory. So that the chemists who analyze the steel for your automobile and the medicines for your prescriptions may separate the various ingredients through surfaces that will not add any substances to put falsehoods in their results, filter papers are made that burn to an ash only 1/100,000 of the paper's weight, and are absolutely clean of all but extremely pure cellulose fibre.

For your drawings, paper is made with a tooth that bites off the end of the pencil making uniform shading. For blueprints, paper is made that can be soaked wet on one side with a chemical solution without striking through to the other, and strong enough to stand washing in water after the print is developed. For photographs, there is a surface as smooth as glass upon a backing of paper, and to keep photographic supplies from light that would spoil them, they are wrapped in black paper that is absolutely opaque. If the picture is worth keeping, one way to preserve it is in an album made of black rag fibres that cannot go into papers for writing.

That is not all. For good measure here are a few projects taken at random from the work-planning

chart of a progressive paper company's technical department: Development of a tester for measuring the erasing quality of ledger paper; the chemical theory of bleaching; the influence of paper color on eye fatigue; cause of glue spoilage; the cause of paper discoloration with age; the theory of rosin sizing; the development of paper for paper reed furniture, for electrical insulating purposes, for artistic catalogue covers and candy boxes; paper for new developments in the printing trade and for the postal cards that travel from coast to coast for a cent. Not very long ago there were problems regarding paper for thrift stamps and paper to stick them upon, now in your service, and there is more paper to help decide who will be elected to the responsibility of guiding the nation for the coming four years.

Paper has to be built upon a machine that draws the fibres into a sheet from a thin floating milk of them, and modifies that sheet down to fractions of a mil, which is a thousandth of an inch. American business always was a fascinating thing to watch, and the business of making paper to your requirements grows stiffer in its problems, more enthusiastic in its own possibilities, and more promising in its achievements every day. To keep you provided with a light, clean and pliable surface upon which to do business, the American papermaker has brought in the specialists in the lines related to his, and he is not only learning to get more out of his materials, but is replacing previous guesswork with accurate recording instruments, slow moving machines with faster and wider ones, and is building his delicate wire screens of resistant nickel alloys to increase the production of his plant and to keep it running at top speed, so you can have your daily paper, your individual drinking cups, your correspondence, and the many other things you may see around you right now wherever you are.

Ninth Annual Conference of Hammermill Agents

Held on August 25, 26 and 27, 1920, at Erie, Pa.

THE importance of the annual conferences of Hammermill Agents, which began nine years ago when twenty-two responded to the invitation of the Hammermill Paper Company, Erie, Pennsylvania, to meet with them and discuss trade conditions has been constantly increasing until on August 25, 26 and 27, one hundred forty-five representatives of the over one hundred agencies with which the company has connections attended the 1920 gathering, and thereby established a record by not only exceeding in number any previous attendance, but for the greatest amount of good which was obtained from it by all who were concerned in the event.

Unusual interest in the matters brought before the business conference and the discussions that followed was the result of general trade conditions, difficulties of getting materials and growing transportation complications. A number of important matters were considered and the general policy of the company for the coming year was outlined. The conference began practically on Tuesday, the 24th, with the meeting of the Hammermill Jobbers' Advisory Committee consisting of W. F. McQuillan, Boston, Mass., chairman; John Leslie, Minneapolis, Minn.; John Swigart, Chicago, Ill.; E. R. Carpenter, Grand Rapids, Mich; E. A. Petrequin, Cleveland, O.; A. B. Sherrill, Philadelphia, Pa.; R. P. Andrews, Washington, D. C.; L. A. Colton, San Francisco, Cal., and Spencer Lathrop, New York City.

On the morning of the 25th, the business of the 1920 conference began at the Kahkwa Park Inn,

Group Picture Taken at the Ninth Annual Conference of

where a display was exhibited of all the ingredients which go into the making of Hammermill paper, arranged in the order and proportion of their use. Addresses were made by President Ernst R. Behrend, Vice-President Norman Wilson, C. W. Chabot, advertising manager of the Hammermill Paper Company, and Charles J. Babcock, of the George Batten Company, Inc., advertising agency of New York City. The announcement was then made that Wm. S. Epply, formerly assistant manager of sales, had been made sales manager to succeed Norman W. Wilson, whose duties of vice-president are commanding his entire attention. Harrison Baldwin, formerly assistant advertising manager, has been transferred to the sales department in the capacity of assistant sales manager, where he will devote all of his time to sales promotion work. These two men are extremely popular and the announcement was greeted with hearty applause. Louis J. Epply has been made assistant advertising manager, and Wm. E. Marsh, formerly connected with the Western Newspaper Union of Oklahoma City, will handle the copy end in that department.

The evening was given over to the enjoyment of the generous and famous hospitality of President Behrend, who served the guests on the lawn of his residence. The dinner was excellent and music was furnished by the Hammermill Band.

Thursday Night Banquet

The business of the conference lasted all day on Thursday, the 26th, and concluded with a banquet in the evening at the Masonic Temple, which was attended by about three hundred persons. In keeping with the custom of former years, the mill executives and department heads were invited to participate. The hall was decorated lavishly with the gayest of colors and from the stage which resembled a tropical garden, an orchestra poured out the strains of popular music. A male trio sang some excellent selections, and led by Roy Gourley of the Y. M. C. A., the dinner was enlivened with community songs. Souvenirs in the shape of a sand shaker and quill with an inscription reminding one to contemplate the progress of development from the time that writing was done with a quill and blotted with sand, were placed at each plate, together with menus and song booklets printed on Hammermill variegated covers. Seated at a special table with leather bound blotter book souvenirs sat the members of the Hammermill Old Guard consisting of men who have attended at least five consecutive meetings, and at another special table were members of the Hammermill organization who have been with the company for twenty years. Pasted on the walls were silhouettes of agents who attended the year previous.

Address of President Behrend

President Behrend was the toastmaster of the occasion and in his opening address said in part:

"It is well, gentlemen, that many men of our organization should gather with you, our agents and distributors, at least once a year. It is necessary that our men realize that these conventions are not a session of gaiety or a feast of joy, but that they are a serious and most important occasion; that they are the annual review of our policy in our service to you; that it is at these conventions that we come before you to obtain your criticism or your commendation. It is for them to realize the importance to themselves, individually, of Hammermill's reputation. It is for them to realize that Hammermill's reputation is inseparable from their own and that the measure of good will which may be extended to them individually should they visit you, is commensurate with the reputation which they establish for Hammermill. The contact that we of the Hammermill have at these meetings with you, our agents, is of the utmost importance. It is educational and it guards against misunderstanding. Chas. Lamb was right when he said, "You cannot hate a man you know." How often have we all found that misunderstandings that seem to grow by correspondence are quickly dispersed by a personal contact.

"The Chairman of the Advisory Committee made

Hammermill Agents, Erie, Pa., August 25, 26 and 27, 1920

a statement yesterday during our meeting which pleased me greatly. He said that there were two kinds of firms; some who were only thinking of the making of money and some who in the pursuit of their business followed definite ideals. He stated that Hammermill belonged to the latter class. Idealism, gentlemen, means the unattainable. We do have our ideals and the fact that we fall short of them only proves them to be ideals because that what is done is the accomplishment and that for which we strive is the ideal. Hammermill's greatest ideal is to attain a reputation of absolute square dealing with our employees, the people we sell to, and the people we buy from. We desire to be believed and to have the confidence of those with whom we work. I have often said in our own organization, that anyone who does not have that confidence in the management should, out of his own self respect, not work at Hammermill. I say the same thing to you, our distributors: 'Do not come here and do not handle our goods unless you can give us your confidence.'"

He spoke of the distinct national service performed by Hammermill during the war when millions of pounds of bond paper was sent to Washington to be run through the printing presses.

Other speakers included Hon. James Logan, general manager of the United States Envelope Company, Worcester, Mass,; R. P. Andrews, of Washington, D. C., president of the National Paper Trade Association; John Leslie and W. F. McQuillan, respectively ex-chairman and chairman of the Advisory Committee, and F. P. Klund, of Hammermill, who spoke for the twenty-year men. The closing talk was made by Vice-President Norman W. Wilson.

The Midnight Minstrel

Following the banquet, the guests were taken to the Kahkwa Park Inn, where a "Midnight Minstrel" performance was staged and described as a combination of the worst efforts of Ziegfeld, Lincoln J. Carter, Neil O'Brien and the man who wrote the Arabian Nights. The guests were handed large flat stones as admission "tickets" along with a card of explanation that this was the regular thing before paper was invented. The staff consisted of Pete Wilson, producer; Leo Joy, art director; George Stephany, director, and Clifford Ellis, stage director. In the cast were Harrison Baldwin, Michael Harrison, Charles Milner, Ed Heal, Lou Epply, and many others.

The fine work of Leo Joy, who painted the scenery and sang beautifully, is worthy of the highest praise, and the whole play showed traces of the fine Italian hand of C. Washington Chabot, advertising manager of Hammermill. It has been a long time since a staid bunch that sells paper has crowded so many laughs into a short time.

Wm. F. Hirst of Swigart Paper Company, Chicago, put on his usual successful comedy stunt, and was assisted by Fred Jurs, also from Swigart, who sang like Caruso. Mr. George Sullivan rendered a beautiful piano solo.

Friday's Outing

The following day was given over to the outing given at the beautiful Kahkwa Club. Many of the guests played golf, while every one tried their skill at target and trap shooting. The baseball game between teams selected from the East and West was easily won by the latter, by the smothering score of 15-0. A most comical stunt was the pipe race which was won by Wm. Preston, Western Newspaper Union, Fort Wayne, Indiana. The ability to win this race required a peculiar skill. In the evening a banquet was given at the Hotel Lawrence and thus was closed a memorable event in the history of the Hammermill Paper Company.

What the World Wants

The world is waiting for the man
Who will gladly do the best he can;
It has high salary to pay
To him who is content to stay
Upon the job, and labor on
Until he knows his work is done.

The world is seeking hard to find
The worker with a cheerful mind;
It wants a youth of pluck and skill
Who'll use his brain, and work until
The finished task at last he sees
Before he wants to be at ease.

The world has high reward to give
To him who does not want to live
As one who merely drifts along,
And fears to breast the current strong;
It wants a youth of sparkling eye,
Who sees a goal and dares to try.

The world pays well for men of brains
And honest toil and taking pains;
'Twill lift above the common lot
Of "didn't think" and "I forgot,"
The man who, in a time of need
Can well be trusted with the deed.

The world is waiting for the man
Who'll look ahead and think and plan
And feel, no matter what his post,
That he is where he's needed most,
For such a man there's work to do—
And, boy, it might as well be you.

—By Edgar A. Guest.

The Passing of "Old Dobbin"

By J. W. SPAULDING
The White Company

MANY a tearful story has been written about plucky champions who have struggled valiantly but hopelessly to retain supremacy beyond their day. But the passing years are unrelenting and eventually the idolized title-holder, confronted by overwhelming odds, must pass from the radiant lights of prominence to the Stygian darkness of obscurity.

"Vale Dobbin" has already been written in the pages of transportation history. There are signs that the faithful slave of the harness—already outstripped by the speedier, more modern and tireless motor truck—has reached the stage where the momentum of his down grade trot is carrying him with ever-increasing speed toward the end of the road and oblivion.

In New York City, for instance, census enumerators found 128,224 horses in 1910. In 1919 the stable enumeration conducted by the Sanitary Bureau of the Board of Health in that city disclosed the presence of but 75,740 equines. The number had fallen to this low figure from 108,036 in 1917, indicating that the rate of passing has increased rapidly during the last few years, during which commercial motor trucks have risen to their point of greatest prominence. It is significant to note, too, that New York (where the horse is disappearing so rapidly) shows a greater gross registration of automobiles for 1919 than any other State in the Union, with a total of 566,511 cars.

Chicago figures on the number of licenses granted for horse-drawn vehicles during the past few years, reveal most vividly the rapid decline of Dobbin. In 1914 the total of such licenses issued was 70,843; in 1915 it was 67,385; in 1916 only 63,803; in 1917 but 60,415 and by 1918 the low mark of 51,793 had been reached.

From these figures it will be noted that there has been a decrease approximating 27 per cent in five years and that 1918, a year marked by a sudden appreciation of commercial motor truck service, showed a net decrease of 8,622 horse-drawn vehicles over the year previous, or a little over 14 per cent in a single year.

The figures quoted for the two largest American cities are not exceptional. While the percentage of decrease varies between city and country and in different localities, due largely to the varying character of roads and their availability for truck uses, it remains fairly constant throughout the States—at least sufficiently so to justify the statement that Dobbin is really passing as a factor in the transportation of the world's commerce.

Now let us contrast with the statistical story of Dobbin's decadence the chapter written simultaneously, on the arrival of the motor truck. The total automobile registration in the United States for 1919 was 7,558,848, or one car to every 14 persons. For the motor truck it was a progressive year.

Delivering Paper from Mill to Store

Truck production gained 39 per cent over 1918. There were 316,364 trucks made in the United States last year, bringing the total registration of trucks in the country up to 750,000.

Motor Trucks in the Paper Industry

For the purposes of this article we are interested, primarily, in the evidence bearing on Dobbin's passing in the paper industry. Other industries, it is admitted, have discarded horse-drawn equipment in large degree, due in a measure to the character of the hauling required in these industries. In builders' supplies, contracting, road building, textile manufacture, lumber, oil, and other producing industries, motor trucks have practically eliminated the horse, and the paper industry is fast joining the ranks. Naturally, in some branches of the paper industry, due to the great bulk and comparatively light weight of the product handled, the truck has been slow to establish its economy, but even in these cases it has now come to be accepted as the required transportation unit.

The versatility of the motor truck has had much to do with its popularity. That it widens the delivery radius of its operator is admitted. As a freight handler it covers more ground, carries greater loads, moves more rapidly and economically than horses can possibly do. In emergencies it provides supplementary transportation for hauls usually intrusted to the railroads.

The A. Geo. Schulz Company, paper box manufacturers of Milwaukee, report a case in point. During

the war period they found themselves handicapped by poor railway service, which was aggravated by heavy snow storms. They had previously demonstrated the worth of two auto trucks owned by the company in city delivery, and in this emergency they found it economical to make deliveries to near-by cities, in some instances reaching out 35 miles from their factory. The Schulz Company uses enclosed bodies 14 ft. long, 6 ft. wide and 6 ft. 6 in. high, affording ample protection to their product. In the face of severe snow they were able to operate their trucks daily.

The Great Northern Paper Company operate four auto trucks at their Millinocket (Me.) mill. Two of these trucks are used in hauling ashes from the boiler house to various points in the millyards and to points about town. The dump bodies of these trucks permit the most economical handling of ashes, and the dumping and spreading of the product wherever required with a minimum loss of time. "They are much more satisfactory than horses in this work," reports the superintendent of the plant. The other trucks are in constant use hauling freight from cars and in moving heavy machinery and are equally efficient.

The Bryant Paper Company of Kalamazoo, Mich., and the Dill & Collins Co., of Philadelphia, also operate motor trucks. The first named company hauls timbers, freight and general materials to and from the railway stations. The Dill & Collins Co. use their trucks for delivering paper from the mill to their Philadelphia store, and to customers within a hauling distance of approximately six miles. They also carry mill machinery, freight and supplies. "They operate," says Mr. C. N. Collins, "over the roughest kind of Philadelphia streets, and we have found them economical, efficient and dependable."

Specific testimony bearing on the substitution of motor trucks for horses, by reason of proved efficiency of motor vehicles, comes from dealers as well as from manufacturers. Among the former are such well known firms as Crescent Paper Company, of Portland, Oregon, whose truck has traveled over 50,000 miles, at an operating cost which the owners declare to be nominal, and has taken the place of at least three delivery teams.

Frank Silvers, a Philadelphia dealer, says he has driven his truck more than 100,000 miles. "It has done the work of three teams at very much less expense," he testifies.

The Central Paper Company of Cleveland has operated a truck for seven years. This truck has covered more than 100,000 miles, and "It is just as good today as when we bought it," says Mr. N. T. Kopf. "The repair charges have been almost nothing."

The Blake-McFall Company of Portland, Oregon, says it operates its two motor trucks at one-half the cost of team work.

Manufacturers Favor Truck Hauling

Manufacturers are equally favorable to truck hauling, as compared with horses. The New York-New England Company of Holyoke, Mass., report that their truckage charges, as compared with horse-drawn vehicles, are about one-half. The National Paper Stock Company of Indianapolis, Ind., says that "Considering mileage and rapidity of service 60 per cent economy in operation expense is obtained by the use of our motor trucks over teams."

The West Virginia Pulp & Paper Company reports the economical use of a motor truck by a pulp wood contractor. He uses it over rough country road, and in spite of that handicap, turns in a 30 per cent less operating expense than when he used teams. "A decided advantage in favor of the truck," says Mr. Richard Beaston, "is that it gives a much wider radius of operation. The contractor is at present hauling pulpwood about twice the distance it would be practical to haul with a team."

The Great Northern Paper Company's mill at Madison, Maine, says that the 3-ton truck used there is traveling over rough gravel and clay roads, unsuited for it, but is none the less hauling coal, ashes, lime, sand, etc., and "doing the work formerly done by two pairs of horses." While the same company's Bangor office reports that "our cost per ton mile for hauling with trucks is about 26 cents, and our cost per ton mile with horses is about 43 cents." The company is now operating ten 5-ton, and one 1-ton trucks.

Many other paper manufacturers report the steady performance of motor trucks, and the general character of the work which they are doing, and doing more effectively and economically than has heretofore been possible with horse-drawn equipment.

The Robert Gair Company of Brooklyn, manufacturers of corrugated paper containers and other paper products, have found that auto trucks can be used with great economy in shipping products to a considerable distance. By their packing, double handling, freight and express, and other items are eliminated, and the goods are delivered more rapidly. Inter-plant deliveries of material are effected with little loss of time, and production stimulated. Horses have been practically eliminated by the trucks of this company.

These instances of truck efficiency in the paper industry are quoted at random. They are not meant to cover the whole field of the industry, but merely to suggest the proportions which truck transportation have assumed in the manufacture and handling of paper and paper products. The universal testimony of economy and efficiency, of number of horses displaced and greater territory covered by modern transportation, but serves to emphasize that in the paper industry, as in all other industries where trucks have secured a foothold, gallant, faithful old Dobbin is fighting a losing fight in his effort to retain his title of king of transportation.

Selection and Testing of Rosin Size

By E. G. MILHAM, Chem. Engr.
Bryant Paper Co.

In the eyes of most practical mill men, very few materials used in the manufacture of paper possess the mysteries and uncertainties of rosin size. The following article is written with the belief that it will help clear up a few of the mysteries and enable the man in the mill to eliminate at least some of the uncertainties which too often accompany the use of this material.

FOR most of the readers of this paper it would be superfluous to state that, in general, rosin size is used in paper to make it resistant to ink. The rosin, after proper preparation, is added to the stock in the beater where it is thoroughly mixed in order that each of the individual fibres may be given a thin coat of the size. When the fibres, thus coated, pass over the dryers of the paper machine, the rosin melts and flows into the spaces between the fibres, thus giving the paper a more or less continuous and ink-proof surface. The problem of sizing paper with rosin consists largely of manipulating various factors in such a way that the spaces mentioned above may be filled up as uniformly and as economically as possible.

Preparation of Rosin Soap

Since rosin will not mix with water, a special method must be used to introduce it into the stock. The method may be described, briefly, as follows: Raw rosin, usually of a quality known as "G" grade, is cooked for several hours in an open tank with soda ash and water. As a rule, eight to nine pounds of soda ash and about four gallons of water are used per hundred pounds of rosin. This treatment, which is known as "Saponification," modifies the rosin to such an extent that it can be mixed with water to form an emulsion from which the rosin can be precipitated into the stock by means of alum. The properties of the soap produced by the above treatment can be altered to a considerable extent by blending different rosins, by varying the proportions of water and alkali used, and by increasing or diminishing the cooking period. Sizes cooked for a short time with a relatively low proportion of soda ash (6 to 7 per cent) are known as high free rosin sizes, while those cooked for a longer time with more soda ash are known as low free rosin, or "Neutral" sizes. Generally speaking, high free rosin and high sizing efficiency go hand in hand. However, this point will be discussed more fully in one of the following paragraphs.

In recent years, several manufacturers of chemicals have made a business of saponifying rosin and shipping it out to the mills in the form of "Rosin soap paste," which contains about 30 per cent of water. At the present time a large proportion of the mills throughout the country buy their size ready made in barrels or tank cars. It is an open question whether this practice of buying prepared size is entirely advantageous to the mills. There is absolutely no doubt but that the rosin size requirements vary in different mills. The most economical size mixture for one mill is not necessarily the most economical for another. The proposition is very similar to that of buying a ready-made suit of clothes. It may fulfill the needs of the buyer, and again it may not. In any case, the buyer doesn't have very much to say about it one way or the other. However, whether the rosin soap be made at the mill or elsewhere, the subsequent treatment given it is the same. This treatment, known as "Emulsification," is of very great importance, since the care with which it is carried out determines largely the effectiveness of the size.

Emulsification of Rosin Soap

The process of emulsification consists essentially of converting the rosin soap paste into a thin "milk" containing about 2 per cent dry size (.167 lbs. per gallon). This is an extremely ticklish proposition, especially in the case of the high free rosin sizes. If the work isn't carried out very carefully, gray, spongy, free rosin is almost sure to separate from the diluted milk. This is very undesirable since it decreases the amount of rosin available for sizing, and also causes no end of trouble by collecting on the walls of tanks and pipes and often producing spots in the finished paper. In fact, the inability to make a good emulsion is the very thing which deprives many mills of the advantages arising from the use of high free rosin sizes.

A common type of emulsifier, consisting essentially of a steam jet siphon, is shown in the accompanying sketch. The soap is heated to boiling in tank "A." The valve is then opened, allowing the size to discharge through pipe "B." At "C" the size is struck by the jet of steam flowing through pipe "D." This completely atomizes the size and carries it into the diluting tank "E," which is about one-third full of hot water. As soon as all the soap in "A" has been emulsified, the proper valves are turned and the tank "E" filled with cold water.

Precautions for Diluting Size

If the following precautions are observed, the apparatus described above should successfully handle sizes carrying up to 30 per cent free rosin. The precautions are as follows:

1. Be sure that the soap in "A" and the water in "E" are hot, before blowing in the size.

2. Be sure that the level of the water in "E" is not above the bottom of "A" before the size is blown over.

3. Be sure that all the diluted size has been drawn from "E" before preparing it for another batch.

4. Be sure that the steam pressure is adequate. (20 to 25 lbs.)

5. Be sure to keep well in mind the fact that lime salts have a very undesirable action on size and that

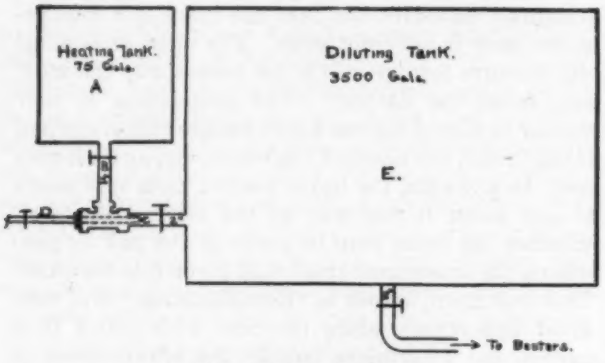


Diagram of an Emulsifier

excessively hard waters should be treated before being used for making up size.

6. Be sure to recognize the fact that the effectiveness of any size depends largely on the attention given to the above details.

Selection of Rosin Size

It is very difficult to make general statements concerning the selection of rosin and rosin size, since the requirements of different mills vary to a great extent. In fact, the most satisfactory way of selecting a size is by the well-known method of trial and error. This method is very slow and tedious, and involves experimenting with various size mixtures until a combination is found which gives the most satisfactory results. However, a few minor points may be given which might serve as guides in the selection of sizes.

1. A good rosin, when broken, should show a clear, glassy fracture.

2. There is practically no relation between the color of a rosin and the value of the size which is made from it. However, if there is a choice between two rosins at the same price, preference should be given to the one which is lightest in color.

3. Within certain limits, there is comparatively little relation between the color of a rosin soap and that of the rosin from which it was made.

4. The high free rosin sizes are the most desirable, IF THEY CAN BE SUCCESSFULLY EMULSIFIED.

5. The matter of moisture content of rosin and prepared soap is of great importance for obvious reasons.

6. Preference should be given to rosin and sizes having a low dirt, low moisture, low ash, and good emulsifying properties.

Testing of Rosin and Rosin Size

The complete analysis of rosin size is an extremely complicated and comparatively uncertain matter. Consequently, only the simpler and more important tests will be discussed here. The important tests on rosin are dirt, insoluble matter, and unsaponifiable matter. The important tests on rosin soap are dirt, moisture, free rosin, combined rosin and soda.

Dirt and Insoluble Matter in Rosin

Dirt and insoluble matter are determined by dissolving 25 grams of a powdered, representative sample in warm methyl alcohol and filtering the solution through a filter paper which has previously been dried and weighed. The residue on the filter is washed three or four times with warm alcohol. The filter is again dried and weighed, the difference being the weight of dirt and insoluble matter. This figure should not run over 1 per cent.

Unsaponifiable Matter in Rosin

To determine unsaponifiable matter in rosin, about 5 grams of the powdered sample are boiled under a reflux condenser for about two hours with 50 c. c. of a strong solution of caustic soda in alcohol. After this treatment, the condenser is removed and the mixture evaporated almost to dryness. The entire residue is then treated exactly as described under the determination of free rosin in rosin size. The value thus obtained is the percentage of unsaponifiable matter in the rosin. It should not run over 10 per cent.

Dirt in Rosin Soap

It rarely occurs that rosin soap contains enough dirt to warrant making a test for it. However, when necessary, dirt may be determined by dissolving the soap in hot water, filtering off and weighing the residue as described under the determination of dirt in rosin. In this case, however, hot water is used in place of warm alcohol.

Moisture in Rosin Soap

Moisture in rosin soap is determined by weighing out about 10 grams of the representative sample into a shallow metal dish and drying it for an hour at 100° C. The loss in weight, multiplied by 100, and divided by the weight of sample taken gives the percentage of moisture in the size.

Free Rosin in Size

Free rosin is determined by dissolving about 2 grams of the soap in 100 c. c. of hot water in a separating funnel, to which is added about 25 c. c. of special acid-free ether made by washing commercial ether with dilute soda ash solution and re-distilling. The mixture in the funnel is then agitated very gently for four or five minutes. The free rosin dissolves in the ether to form a light yellow solution

(*Continued on page* 882)

Hardwood for Paper

By WARREN B. BULLOCK

Director of Forest Extension, New York State College of Forestry

"THE future of the Adirondacks depends upon the development of its hardwoods."

This declaration by Prof. E. F. McCarthy of the New York State College of Forestry at Syracuse, was made at the conclusion of three months of work with a party of foresters in the western Adirondacks as his viewpoint upon the problem of forestry in New York State, and his work has a particular bearing upon the pulp and paper industry. Professor McCarthy was assisted by Prof. H. C. Belyea of the College of Forestry and three assistants. The two men spent nearly three months in the Western and Northern Adirondacks, where they maintained their camp. Considerable study was made in other portions of the Adirondacks, however, and important results were attained in a study of the reproduction of yellow birch.

The study was devoted entirely to yellow birch, which because of its present use to a small extent in the paper industry, and because of its rapid growth offers a possible solution for the threatening shortage of pulp wood for New York's paper mill investments of many millions of dollars. The study was to determine the value of yellow birch in the future of the Adirondack forest, and the study extended to birch in all types and conditions of forest growth.

The importance of the study is shown by the fact that the war census showed there was only about 5,000,000 cords of soft wood in private hands, the rest being in State Forests, not opened for cutting. This would be a supply of only about five years for the mills, if they were not importing in great quantities from Canada to meet their needs.

Birch Grows Rapidly

The importance of birch is not only for its own use, if it can be so developed, but particularly in its relation to other woods, for it has always been a big factor, and will continue to be, in reproduction of any forest, as a rapid growing protective cover for the slower growing hardwoods.

The study made by the College of Forestry experts was to determine such elements as the rate of growth, reproduction, its relative growth as compared to other hard and soft woods, in order to secure definite data on which to base future operations in the forests. The study was extremely detailed, for in some sections strip surveys were made to include every growing tree, even to those an inch in diameter on a typical plot.

That the replanted forest area grows more rapidly than was the case in the virgin forest is now definitely known. Just as the cultivated grain grows and produces more luxuriantly than the same grain prospered in a wild state, so do the trees grow faster, particularly in their early years, than was the case under natural conditions. The virgin forest contains trees which lived 250 to 300 years. Under favorable artificial forest conditions, if a replanted forest can be called artificial, the tree would reach a similar diameter in much less time, and the growth is particularly rapid in the earlier years.

A typical instance was found where it was possible to test a freshly cut tract, from which timber had been taken for cord wood. This tract had once been cleared for pasture, but had been allowed to revert to forest land. It was cleared twenty-three years ago, and when cut now had averaged about thirteen cords to the acre, or a cut equal to a virgin forest growth of soft wood.

"The future Adirondack forest will be largely hardwood," said Professor McCarthy, returning from his survey, "and the problem now is to develop the market for the coming hardwood which is replacing the old soft wood forests, so that ultimately the maximum amount of soft wood may 'come back' under a policy of conservation."

Professor McCarthy's work, however, was only one phase of a study of this problem, particularly with relation to its use in the newspaper industry in which every department of the college participated. Investigations made by the various departments brought out the following general conditions:

There is not now enough yellow birch in the New York forests to be of permanent relief to the paper industry, even if processes are developed to make it a satisfactory substitute for spruce.

A large acreage in New York will pass from a spruce production to that of birch and cannot be prevented. We must use the birch to dispose of it. Yellow birch is being used to some extent, chiefly in Pennsylvania mills, for cheaper grades of paper.

Yellow birch is susceptible of so rapid a growth that it can be grown to sufficient size to be satisfactory for pulp wood, if chemical processes of utilization can be developed, in much shorter time than spruce can be grown.

Low Rate of Damage from Insects

The birch tree, in healthy condition, is comparatively free from insect damage of economic import, contrasted with the destruction of spruce, and balsam, in parts of New England, Maine, Quebec and New Brunswick.

These results indicate to the College of Forestry

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The Duties of a Backtender in a Box Board Mill

By RICHARD CLAYTON

I DO NOT KNOW why he is called "back" tender, as his duties are very similar to the machine-tender. The name probably originated in the old days when the machine was being washed up, the machinetender and backtender would raise the couch to clean the cylinder with acid, the machinetender being on the front side with a pail of acid and a "swab," made with a stick of wood and a piece of felt wrapped on the end, the backtender would turn the cylinder while being cleaned; then the couch would be let down, water turned in the vats, cylinder and felt showers turned on, weights adjusted, etc. The backtender being on the back of the machine while this was going on. However, that name is as good as any; if he is the right sort, he won't keep it long, but will be running a machine himself.

The duties of a backtender are just as important as those of the machinetender, only his responsibility is less. The machinetender alone is responsible for the quality and quantity of output. Therefore a good backtender is invaluable to the success of the machinetender for he can cause an immense amount of trouble by neglect and carelessness.

His duty in all large mills is to watch the felts; keep them on the machine; watch the formation of stock on the cylinders, keeping it uniform so there will be no crushing or "dropping off;" keep the showers clean so that the felts and cylinder faces will not fill up; see to it that the screens are kept clean; the stock pumps in order; keep the press and roll bearings oiled.

When the machine is to be washed up it is the duty of the backtender to have everything ready before the stock is shut off. The washout hose should be lying where it will be needed first; the acid ready for cleaning cylinders; for any repairs to be done, the tools should be ready and no time lost in hunting things up while the machine is down. I have seen a big board machine washed up and the end started over the dryers before the tail end reached the calenders. This, however, is only accomplished where all the help from machinetender to cutter boy is on the job and at his proper place when the stock is shut off at the box.

Like a machinetender, a backtender's work varies in the different mills, size of machine, etc. However, his duties on all machines are the same in one respect; viz., loyalty to his employer and the machinetender; give them the best he has, and if he is any kind of a man, he will teach you what he knows. A good machinetender will not "hide his light under a bushel," but will show his help "How to do it" and save himself a lot of work. A good backtender can save many breaks on the machine by attending closely to business.

If a backtender does not care for promotion and is only waiting impatiently for each pay day to roll around, all he has to do is to do as little as possible, sneak around behind the machine every few minutes to smoke a cigarette, etc. The machinetender will soon get tired of this, and after a genteel "cussing" once or twice, the backtender will find he is a backtender no longer, but only a poor devil out of work.

Confidence Necessary

To become a machinetender, a backtender should have confidence in himself and not become "rattled" if he is left alone with the machine for a while. He should learn the right thing to do, then have the proper amount of nerve to do it. There are some who, however, will never have enough confidence to assume the responsibility, and when they find it out they had better change their vocation. For instance, I had one backtender for six years on a board machine, and, naturally, he knew that machine like he knew his own soul, and was the finest help I ever had, could run it as well as I—while I was with him—but if for some cause I was called away for a few hours, and he was left in charge, it was different. Invariably when I came back, he would be up to his eyes in trouble, throwing "Hay" and sweating blood, and all to no purpose. He only lacked "confidence." The last I heard of him, he was driving an ice wagon. I suppose the horse knows the route, so he hasn't much to think about.

In conclusion, I would say confidence, loyalty and intelligence are most required in a good backtender. Use the "talents" the Almighty has given you and you will succeed.

The Waste Merchants Association of New York, which embodies in its membership all the large paper stock concerns in that city, has filed with the Interstate Commerce Commission a petition for rehearing and reargument in the case against the Director General of Railroads, et al., which concerns the loading charges on paper stock. The petition is based on three points, namely, erroneous conclusions, erroneous conclusions of law, and newly discovered evidence. The complainants allege to have discovered certain material facts which deal with the actual cost of loading service and which heretofore have not been brought out.

Conveyor Hazards

Prepared by the Engineering Department of the National Safety Council

MECHANICAL conveyors have proved very useful as time saving and labor saving equipment for handling material of almost every kind. Conveying equipment of various types and design is now being used in the paper industry, and because of the shortage of labor and the saving in cost realized by the use of this equipment, it is coming into more and more general use.

General Suggestions

There are certain inherent hazards which are common in the use of all conveying equipment, and care should be taken to see that the following general precautions are heeded.

Repairing and Oiling

No adjustments or repairs of any kind should ever be made while a conveyor is in motion. It is also advisable that all oiling of conveyor equipment be done while the machinery is standing still, unless it may be done without requiring the oiler to come within dangerous proximity to moving parts.

Many accidents have been caused by starting conveyors without first giving warning to men who may be making repairs or adjustments, or oiling the machinery. With such equipment, as with other types of power-driven machinery, every repair man should be provided with a lock or a warning sign which he should put on the starting lever or operating switch of the driving machine whenever he is doing work on the conveyor. A rule forbidding any one to remove a lock or a warning sign, person who placed it, should be enforced.

Guard Against Contact

Power-driven conveyor equipment should be guarded with an enclosure or substantial railing wherever persons may come into contact with it. Workmen should be forbidden to cross over exposed conveyors except at regular crosspoints. At all such cross-over points, there should be an elevated bridge cross-over or a tunnel so that there is no danger of any person coming in contact with the conveying equipment.

At points where conveyors pass from one floor to another and are not entirely enclosed, the opening through the floors should be protected by railings and toe-boards. Wherever conveyors cross over passageways, aisle-ways, or places where employees are at work or must pass beneath them, screens should be provided to catch material which may fall from the conveyor.

There is often found a tendency on the part of some workmen, especially boys, to ride on conveyors. Such a practice is decidedly dangerous and should be strictly prohibited.

Control Devices

For all power-driven conveyors, there should be installed devices at frequent and convenient places for stopping the conveyor machinery in case of an accident. Such devices should always be provided at loading and unloading stations, and at drive and take-up ends. Where a series of conveyors is used to transport material through a plant, it is necessary that the stopping devices be so arranged that when one is stopped, all conveyors ahead will also be stopped. This will prevent the dumping of material on a standing conveyor.

Guard Driving Parts

All belts, pulleys, chain, and rope drives of conveyor equipment, whenever located within 7 feet of the floor or working level should be effectively safeguarded. All gears should be completely protected by safeguards. All set screws should be of the countersunk type; sprocket wheels and chains should be properly enclosed. Projecting ends of shafting should be guarded or else cut off.

Inspection

In plants where conveying equipment is extensively used, it is suggested that a competent employee be delegated to make regular and frequent inspection of all the equipment to make sure that it is in proper working order and kept well lubricated. Whenever any broken, defective, or badly-worn parts are discovered, immediate repairs should be made and the equipment should not be continued in service in an unsafe condition.

Safe Footing

Rubber matting or other antislip floor covering at the loading and discharging stations is suggested so that the workmen will have a sure and safe footing. Floors should be kept free of material which may be spilled from the conveyors. Alongside of elevated conveyors, it is well to provide a substantial runway, with standard railings and toe-boards.

Loading and Unloading

Where material is loaded by hand, the speed of the conveyor should be such that workmen will have ample time to place the material in position, so that it will not project over sides of conveyor or be likely to fall. For loading grain and such material, feeding devices are sometimes used, and with them the conveyors may be run at a higher speed. Wherever feeding devices are used, the workmen do not have to place the loads directly upon the main conveyors, and are thus not exposed to as great danger.

The removal of material from conveyors except at regular receiving stations should be forbidden. This is of particular importance whenever articles such as heavy boxes, barrels, and bags are being transported. Workmen should not be permitted to stand on the supporting frames of conveyors while loading or removing articles, because should their feet slip onto the moving conveyor, they are likely to receive serious injuries.

Gravity Conveyors

Gravity conveyors, as the name implies, are those which require no mechanical power, but depend wholly upon the force of gravity for their operation. They may be divided into two general classes; chute conveyors and roller conveyors.

Chute Conveyors

The hazard in the use of spiral chutes is not great. Any such equipment should, of course, be substantially constructed, well supported, and carefully designed for handling material of the size and character for which it is intended.

In removing material from the delivery end of spiral chutes, accidents frequently occur when a workman's hand becomes caught by descending material and mashed against other material which is on the delivery table. Where the chute is an enclosed one, it is suggested that a warning sign be placed over the delivery end of the chute to warn against this hazard. Some simple device, mechanically or electrically operated, to give warning that a package is about to be delivered from the chute is advisable, especially where the packages cannot be plainly seen in descent.

Protection Against Fire

Spiral chutes introduce a very important fire hazard, because they form a flue from lower floors to upper floors which will serve to spread a fire quickly. Two methods of eliminating this fire hazard are in use: One, is to enclose the chute in a tower of steel, concrete, or masonry; the other, is to provide fire doors (draft checks) where the chute passes through floors.

The enclosed tower type has doors at each charging station, and also a door at the delivery end. The charging station doors should be kept closed, except when charging is being done. The door at the delivery end should close automatically in case of fire.

The open type of chute may be made entirely safe against the spread of fire if shutoff doors (draft checks) are installed wherever the chute passes through floors. These doors are of two kinds—the vertical sliding and the shutter types. Both types should be arranged, by means of fusible links, to close automatically in case of fire.

Where the open type of chute is used a guard railing and toe-board should be provided at each floor to protect workmen who might stumble into it. The charging stations should preferably be guarded either by a movable railing or by a hinged door or gate.

Roller Conveyors

The principal hazard in the use of roller conveyor equipment is that of material running off the edge of the roll-way and falling to the floor. A guide, or guard railing, is sometimes provided on each side of roller conveyor ways, to guide the material and prevent it from running off. Such guard rails are especially advisable at corners and turns, and on elevated conveyors where men must work or pass beneath. Workmen should be warned always to place material carefully on the conveyors, so that it will ride safely.

Belt Conveyors

It is important that the driving mechanism of belt conveyors be properly safeguarded. The conveyor belt and trough should also be railed off or otherwise protected so that workmen will not attempt to cross over or ride upon it.

Loading Hoppers

Loading hoppers are ordinarily supplied as a part of belt conveying systems used for handling grain, cement, fertilizer, crushed rock and ore, coal, etc. By the use of loading hoppers, there is less wear on the belt because the material is fed gradually over a space of several feet of the belt. Loading into the hoppers is also less hazardous to the workmen, because there is little danger of the material being thrown out by the moving belt. Where movable hoppers are used, care should be taken that the hoppers are securely and rigidly fastened in place, so that there is no danger of any part of them coming in contact with the belt and an accident resulting.

Discharging Trippers

Trippers or automatic discharging stations are frequently used with belt conveying equipment. Such trippers serve the purpose of emptying the belt of its load at the desired location. Workmen should be cautioned to use care in dislodging material which may become choked up in the chute of a tripper, and to keep away from moving parts.

Great care must be used in manipulating a self-propelled tripper, because should the propelling mechanism be thrown into gear there is a possibility, unless the operator is attentive to the work in hand, that it will run to the end of runway or belt and cause an accident. A device for throwing the propelling mechanism into neutral position should be provided at each end of runway.

Tension in Belt

Care should be taken that the working tension in a belt is not too great. This should not exceed 24 lbs. per inch per ply which is approximately $\frac{1}{8}$ of the breaking strain of a belt. For temporary installations 36 lbs. per inch per ply may be used, but this is

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An Automatic Cooking Control for Chemical Pulp

By C. H. ALLEN

Presented at the Fall Meeting of the Technical Association of Pulp and Paper Industry, on September 1, 1920, at Saratoga Springs, N. Y.

SULPHITE pulp should be cooked automatically for three principal reasons, as follows:

(1) Production will be increased; (2) Quality will be improved; (3) The steam load on the boiler house will be more uniform.

In short, the automatic control which I will describe does for each charge of chips what a good cook tries to do but can never do, because, in the first place, the apparatus he is using places a practical limit on his control, and second, he can not be everywhere at once and think of everything at the same time.

The automatic cooking control system consists essentially of a power-driven steam valve electrically connected to a steam flow meter on the digester steam line, an automatic relief valve, and relief strainers that do not plug. It also includes the automatic separation of relief gas and liquor.

The steam apparatus can be set to maintain any constant or varying steam flow curve. Temperatures within the digester are proportional to the rate of steam input. The control apparatus therefore can be set to give any desirable temperature curve.

Cooking automatically does not necessarily mean that all charges of chips will be steamed on the same steam curve. In practice, where the strength of the acid and quality of chips are reasonably constant, the same steam flow curve should be used on all digester charges; but in cases where the strength of acid and quality of chips vary widely from cook to cook, better results may be obtained by varying the form of the steam curve to suit changing conditions.

These changes in the steam flow curve are very readily and quickly made. The steam curve element of the control system is a small thin plate of copper having an insulated hole, and is slipped over the chart spindle of the steam flow meter clock. The periphery of this piece of copper at any point represents the rate of steam it is desired to carry at that particular instant. The steam curve and paper chart of the instrument are rotated by the meter clock. It is no more trouble to change the steam curve than it is to change the paper chart of the instrument; in fact, the time required is a matter of only a few seconds.

(*Continued on page* 892)

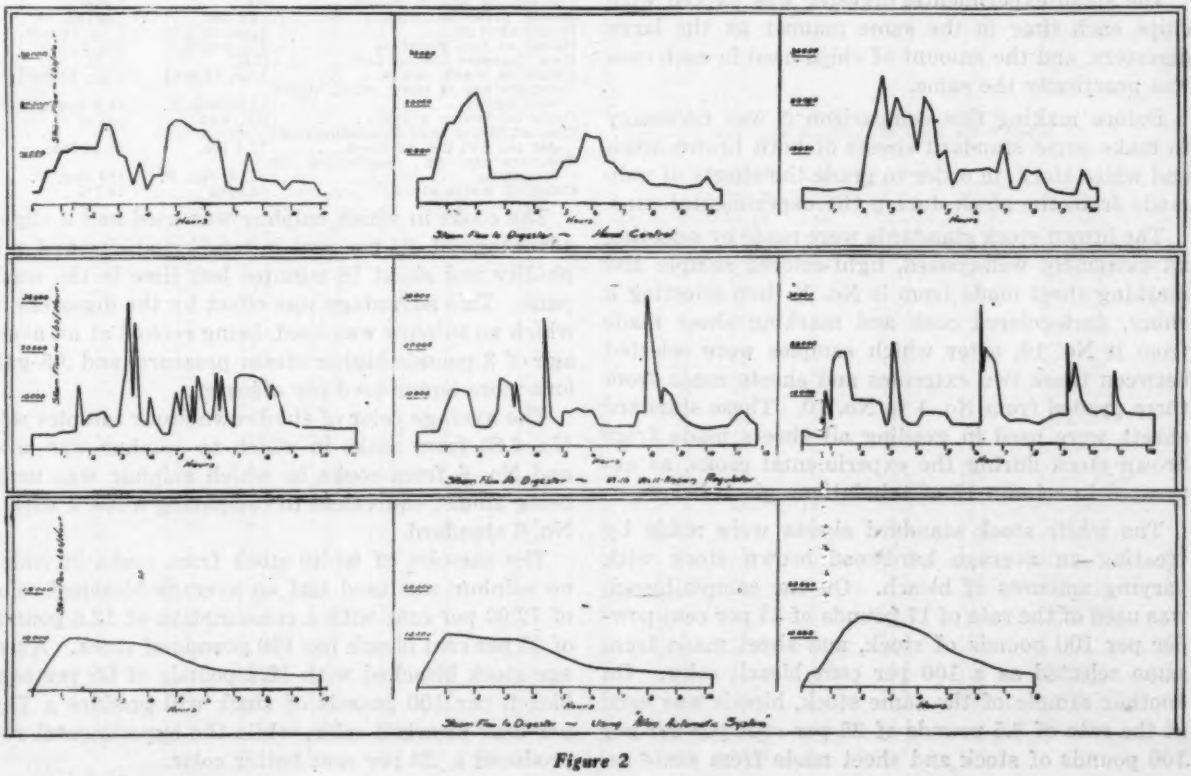


Figure 2

Curtailing Bleach Consumption by Adding Sulphur to Digester Liquor

By GEORGE K. SPENCE

Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, on September 1, 1920, at Saratoga Springs, N. Y.

THERE has been considerable discussion from time to time regarding the benefits to be derived from adding sulphur or sodium sulphide to digester liquor, and acting for your committee the writer has handled one phase of this question by running a series of experimental cooks. These experiments were run over an extended period of time and under the varying conditions met with during the ordinary cooking of stock, so that they are representative of actual cooking conditions.

It is hardly possible to compare individual cooks without microscopical observations of the fibres in the finished sheets, and moisture tests of the chips used in each cook, as the mixture of woods used in the different digesters varies to some extent, and the moisture in the chips varies. As a general rule the average mixture of woods over an extended period of time is practically the same, and as the average moisture in the chips was 23.2 per cent during the experimental runs with sulphur and 22.8 per cent during the experimental runs without sulphur, the general average results are comparable.

The small experimental digester was packed with chips each time in the same manner as the large digesters, and the amount of chips used in each case was practically the same.

Before making this comparison it was necessary to make some standard sheets of both brown stock and white stock, in order to grade the sheets of pulp made from the stock during the experimental runs.

The brown stock standards were made by selecting an extremely well-cooked, light-colored sample and marking sheet made from it No. 1, then selecting a shiny, dark-colored cook and marking sheet made from it No. 10, after which samples were selected between these two extremes and sheets made from them graded from No. 1 to No. 10. These standard sheets were used in grading all sheets made from brown stock during the experimental cooks, as expressed in column 12 of tabulations given below.

The white stock standard sheets were made by treating an average hardwood brown stock with varying amounts of bleach. On one sample bleach was used at the rate of 17 pounds of 35 per cent powder per 100 pounds of stock, and sheet made from same selected as a 100 per cent bleach color. On another sample of the same stock, bleach was used at the rate of 8.5 pounds of 35 per cent powder per 100 pounds of stock and sheet made from same selected as a 50 per cent bleached color. In this same manner a complete set of standard sheets was made by varying the amounts of bleach on samples of the same brown stock, and sheets made from them given their relative values in per cent bleached color. The same bleaching temperature was used in each case. These standard sheets were used in comparing sheets made from stock during experimental cooks and each given its relative value, as expressed in the last column of tabulations given below.

Table No. 1 gives results obtained during thirty-five experimental cooks in which no sulphur or sodium sulphide was used.

Table No. 2 gives results obtained during thirty-five experimental cooks in which sulphur was used at the rate of 1.1 pounds per 100 pounds of stock cooked.

The summaries of the above tables can be compared as follows:

Average	Without Use of Sulphur	When Using Sulphur
Gallons of liquor used	43.4 gals.	42.75 gals.
Beaumé strength of liquor at 60 deg. F.	11½ deg. Bé.	11½ deg. Bé.
Causticity of liquor	94.2%	94.14% plus .9% sulphidity
Percentage salt in liquor	94%	1.05%
Steam pressure	113 lbs.	110 lbs.
Hours shut in	1 hr. 20 min.	1 hr. 14 min.
Hours at full pressure	4½ hours	4½ hours
How digester discharged	O.K.	O. K.
Hours in wash pan	4 hr. 12 min.	3 hr. 54 min.
Temperature of stock when bleach was added	81.25 deg. F.	84.9 deg. F.
Color of brown stock	No. 6.83	No. 6
Lbs. of 35 per cent bleaching powder per 100 lbs. of stock	12.2 lbs.	11.74 lbs.
Temperature at completion of bleaching	123.4 deg. F.	126 deg. F.
Color of white stock	72.03%	74.7%

The cooks in which sulphur was used had a slight advantage of .84 per cent in total causticity and sulphidity and about 18 minutes less time in the wash pans. This advantage was offset by the digesters in which no sulphur was used, being cooked at an average of 3 pounds higher steam pressure, and .65 gallons more liquor used per digester.

The average color of the brown stock samples was No. 6.83 from cooks in which no sulphur was used and No. 6 from cooks in which sulphur was used, being almost equivalent to comparing a No. 7 with a No. 6 standard.

The samples of white stock from cooks in which no sulphur was used had an average bleached color of 72.03 per cent with a consumption of 12.2 pounds of 35 per cent bleach per 100 pounds of stock. Average stock bleached with 12.2 pounds of 35 per cent bleach per 100 pounds of stock will produce a 71.8 per cent bleached color, while the experimental run produced a .23 per cent better color.

The samples of white stock from cooks in which sulphur was used had an average bleached color of 74.7 per cent with a consumption of 11.74 pounds of 35 per cent bleach per 100 pounds of stock. Average stock bleached with 11.74 pounds of 35 per cent powder per 100 pounds of stock will produce a 69.06 per cent bleached color. Making the same allowance as above, this amount of bleach should have produced a 69.29 per cent color if no sulphur had been used, and since by use of sulphur we secured a 74.7 per cent bleached color, this would mean a difference of 5.41 per cent.

This saving of 5.41 per cent of 17 pounds or .92 pounds of bleach per 100 pounds of stock can be attributed to the use of sulphur in the digester liquor, since all of the other conditions were practically balanced.

Since it required the use of 1.1 pounds of sulphur per 100 pounds of stock to save .92 pounds of 35 per cent bleaching powder there would be very little advantage in its use under normal conditions if this were the only virtue to be considered.

However, it is claimed that an increased yield and strength is produced by its use in digester liquor, which will furnish material for future experiments in order to determine the extent of this increase.

EXPERIMENTAL SODA MILL COOKS WITHOUT USE OF SULPHUR

TABLE NO. 1

Cook No.	Liquor Used, Gals.	Strength of Liquor, Deg. Bé.	Causticity of Liquor, Per Cent	Salt in Liquor, Per Cent	Average Steam Pressure, Lbs.	Hours Shut in, Hours	Hours at Full Pressure, Hours	How Digester Discharged	Hours in Wash Pan, Hr. Min.	Temp. of Stock When Bleach Was Added, Deg. F.	Color of Brown Stock, No.	Lbs. of 35% Bleach per 100 Lbs. of Stock, Lbs.	Temp. at End of Bleaching, Deg. F.	Color with Iodized Starch	Color of White Stock, Per Cent
1.....	45	11	94.8	.99	108	3	4½	O.K.	2 35	78	6	15.7	128	Light Blue	100
2.....	43	11½	94.8	.99	109	3	4½	O.K.	2 40	75	4	11.3	128	Light Blue	88
3.....	43	11⅝	92.5	.99	110	3	4½	O.K.	2 40	80	6	12.6	113	Light Blue	84
4.....	44	11¾	94.6	.99	110	3	4½	O.K.	2 35	74	6	12.6	118	Light Blue	82
5.....	43	12	92.1	.99	112	3	4½	O.K.	4 40	78	7	15.7	113	No color	86
6.....	42	12	91.9	.99	112	3	4½	O.K.	4 0	85	6	12.6	123	No color	82
7.....	43	12	92.4	.99	112	3	4½	O.K.	4 0	84	5	9.5	125	Light Blue	65
8.....	42	11⅝	94.1	.99	117	2	4½	O.K.	3 40	78	5	10.7	133	No color	80
9.....	42	11⅝	93.0	.99	116	0	4½	O.K.	4 20	82	8	13.7	134	No color	70
10.....	43	11⅞	95.7	.99	116	0	4½	O.K.	3 20	78	6	10.7	137	No color	65
11.....	44	11¾	95.3	.99	116	0	4½	O.K.	4 25	78	7	11.3	134	Light Blue	70
12.....	45	11	96.6	.99	116	0	4½	O.K.	4 55	80	8	13.7	136	No color	65
13.....	45	11	96.8	.99	116	0	4½	O.K.	4 0	78	7	11.3	128	No color	70
14.....	44	11¼	92.1	.99	117	0	4½	O.K.	5 35	77	10	14.2	121	No color	60
15.....	44	11¼	92.5	.99	117	0	4½	O.K.	6 35	82	10	15.7	121	No color	72
16.....	44	11½	94.5	.99	118	0	4½	O.K.	5 10	82	8	12.6	118	No color	60
17.....	43	11½	92.3	.99	119	0	4½	O.K.	4 55	84	7	10.7	118	No color	62
18.....	43	11½	93.8	.99	118	0	4½	O.K.	5 25	80	8	14.2	131	No color	78
19.....	45	11	94.5	.99	117	0	4½	O.K.	5 50	83	8	13.7	126	No color	68
20.....	45	11	92.8	.99	116	0	4½	O.K.	4 20	80	6	11.3	137	No color	72
21.....	45	11	95.5	.99	116	0	4½	O.K.	4 35	81	5	11.3	128	No color	85
22.....	43	11½	93.6	.99	116	0	4½	O.K.	4 5	80	4	9.5	118	No color	72
23.....	42	11⅝	93.6	.99	118	0	4¾	O.K.	4 50	83	7	11.3	125	No color	70
24.....	42	11⅝	95.6	.99	114	2	4½	O.K.	5 0	80	9	13.7	122	No color	60
25.....	44	11⅝	95.6	.99	110	2	4½	O.K.	5 35	84	9	14.2	120	No color	62
26.....	44	11¾	95.6	.99	109	2	4½	O.K.	3 30	83	6	10.7	115	No color	68
27.....	42	12	92.8	.99	107	2	4½	O.K.	5 30	83	8	12.4	115	No color	58
28.....	43	11½	94.8	.76	110	2	4½	O.K.	3 20	83	7	10.7	115	No color	62
29.....	44	11¾	94.8	.76	110	2	4½	O.K.	3 30	85	7	11.3	118	Light Blue	68
30.....	43	11½	94.8	.76	109	2	4½	O.K.	3 25	84	7	11.3	122	No color	70
31.....	42	11⅝	94.8	.76	109	2	4½	O.K.	3 20	86	7	14.2	120	No color	85
32.....	42	11⅝	94.8	.76	109	2	4½	O.K.	3 35	83	5	9.5	116	No color	72
33.....	42	11⅝	94.8	.76	109	2	4½	O.K.	3 40	86	6	10.7	120	No color	70
34.....	44	11¾	94.8	.76	110	2	4½	O.K.	3 45	83	7	11.3	122	No color	70
35.....	44	11¾	94.8	.76	110	2	4½	O.K.	3 40	82	7	11.3	136	No color	70
Average	43.4	11½	94.2	.94	113	1.34	4½	O.K.	4 12	81¼	6.83	12.2	123.4		72.03

EXPERIMENTAL SODA MILL COOKS USING 1.1 LBS. OF SULPHUR PER 100 LBS. OF STOCK

TABLE NO. 2

Cook No.	Liquor Used, Gals.	Strength of Liquor, Deg. Bé.	Causticity of Liquor, Per Cent*	Salt in Liquor, Per Cent	Average Steam Pressure, Lbs.	Hours Shut in, Hours	Hours at Full Pressure, Hours	How Digester Discharged	Hours in Wash Pan, Hr. Min.	Stock When Bleach Was Added, Deg. F.	Color of Brown Stock, No.	Lbs. of 35% Bleach per 100 Lbs. of Stock, Lbs.	Temp. at End of Bleaching, Deg. F.	Color with Iodized Starch	Color of White Stock, Per Cent
1.....	42	11⅝	93.4	1.00	110	0	4½	O.K.	7 10	82	7	13.1	116	No color	75
2.....	44	11½	94.7	1.00	110	0	4½	O.K.	7 40	86	8	15.7	131	Light Blue	72
3.....	39	11½	95.0	1.00	110	0	4½	O.K.	3 25	85	6	12.2	116	Light Blue	80
4.....	43	11½	93.1	1.12	108	3	4½	O.K.	3 45	82	6	12.2	128	No color	80
5.....	42	11⅝	94.0	1.12	109	3	4½	O.K.	3 55	86	6	12.2	139	No color	80
6.....	43	11½	93.2	1.12	108	3	4½	O.K.	3 45	86	6	14.0	133	No color	82
7.....	43	11½	95.3	1.12	107	3	4½	O.K.	3 15	90	6	12.2	133	No color	75
8.....	42	11⅝	93.7	1.12	109	2	4½	O.K.	3 10	82	6	12.2	130	No color	75
9.....	43	11½	94.5	1.12	109	2	4½	O.K.	4 35	82	6	13.1	126	No color	82
10.....	43	11½	94.7	1.12	108	3	4½	O.K.	5 10	85	7	14.0	130	No color	80
11.....	42	11⅝	94.5	1.12	109	3	4½	O.K.	7 0	84	8	12.2	130	No color	62
12.....	42	11⅝	93.6	1.12	107	2	4½	O.K.	3 45	88	6	12.2	130	No color	80
13.....	41	12	93.3	1.12	110	0	4½	O.K.	3 25	85	5	9.1	135	No color	70
14.....	42	11⅝	93.4	1.12	108	0	4½	O.K.	3 25	85	5	9.1	133	No color	70
15.....	41	12	93.5	1.12	108	0	4½	O.K.	4 45	85	7	12.2	132	No color	65
16.....	41	12	93.5	1.12	110	3¼	4½	O.K.	3 0	86	6	12.2	122	No color	72
17.....	41	12	93.2	1.12	107	3¼	4½	O.K.	2 55	80	6	9.1	124	Light Blue	60
18.....	41	12	93.6	1.12	108	3¼	4½	O.K.	2 55	86	6	10.3	124	Light Blue	68
19.....	43	11½	93.5	1.12	107	3¼	4½	O.K.	3 20	84	7	12.2	122	No color	62
20.....	43	11½	94.5	1.12	113	3¼	4½	O.K.	4 0	85	7	14.0	133	No color	72
21.....	44	11¼	94.5	.97	112	0	4½	O.K.	2 50	82	5	9.5	122	No color	78
22.....	45	11	94.4	.97	112	0	4½	O.K.	2 40	85	6	11.3	118	No color	70
23.....	42	11⅝	94.4	.97	112	0	4½	O.K.	4 35	83	6	10.1	120	Light Blue	65
24.....	43	11½	93.4	.97	112	0	4½	O.K.	3 20	86	6	10.1	116	No color	65
25.....	43	11½	93.7	.97	114	0	4½	O.K.	2 40	91	5	9.5	126	No color	75
26.....	43	11½	94.6	1.00	113	0	4½	O.K.	3 35	84	5	10.1	135	No color	80
27.....	43	11½	94.6	1.00	113	0	4½	O.K.	2 35	87	5	12.5	134	No color	88
28.....	43	11½	94.5	1.00	114	0	4½	O.K.	3 5	85	5	9.5	125	Light Blue	76
29.....	41	12	93.7	1.00	113	0	4½	O.K.	3 5	82	6	12.9	123	No color	80
30.....	42	11⅝	94.0	1.00	113	0	4½	O.K.	3 25	84	6	13.1	121	No color	82
31.....	44	11¼	95.1	1.00	114	0	4½	O.K.	4 15	83	5	9.5	122	No color	75
32.....	47	10½	95.2	1.00	111	0	4½	O.K.	4 05	84	6	8.9	120	No color	68
33.....	46	10⅝	95.0	1.00	111	0	4½	O.K.	4 20	88	7	12.9	116	Light Blue	70
34.....	44	11¼	94.8	1.00	112	0	4½	O.K.	4 30	84	6	14.1	125	No color	90
35.....	44	11¼	94.8	1.00	111	0	4½	O.K.	3 40	86	4	13.1	124	No color	92
Average	42.75	11⅛	94.14	1.05	110	1 14 m.	4½	O.K.	3 54	84.90	6	11.74	126		74.7

*Plus .9 per cent sulphidity.

One Man Does Twice the Work of Four

By C. W. GARRISON

THE Hummel & Downing Company, paper manufacturers of Milwaukee, save 8 cents per roll in handling cost, double the storage capacity of their warehouse and release for more productive labor three men formerly needed for the work. This saving has been accomplished with the ajd of a truck.

Figure 1

The rolls of paper, weighing 1300 lbs., are delivered by elevator to the upper floors for storage, and must be trucked an average distance of 200 ft. Formerly, men with two-wheel hand trucks performed this work, and the rolls were tiered occasionally by the use of a hand tiering machine.

Figure 2

By timing the speed of this hand operation, the men merely up-ending the rolls in a single tier, it was found that four men with a haul of 300 ft. stored forty rolls in two hours at a cost of 10 cents per roll.

With the new system, the elevator is stopped high enough above the floor level so that the paper may be rolled off on the platform of the elevating and load carrying lift truck, which transports the paper, two rolls at a time, to the desired point.

For the first tier, the rolls are up-ended, a method of doing this having been devised by the truck operator himself, who elevates the truck platform to a height determined by experience, rolls the paper off at an angle until the roll overbalances and slides to the floor. The second and third tiers are reached by elevating the truck platform to the proper height and rolling the paper off, leaving the rolls on their sides.

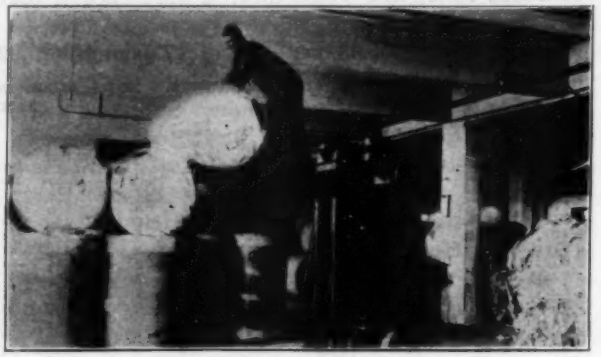


Figure 3

Under the same conditions as in the hand method, one man using the 76 in. maximum lift truck, was able to handle ninety rolls in two hours, standing the bottom tier on end, and tiering three high, at a cost of 2 cents a roll. This represents to the Hummel & Downing Company a clear saving of 8 cents per roll in handling cost, doubles their storage capacity and enables them to transfer to more productive labor three of the men formerly needed for this work. The truck represents an investment of approximately $3,000.

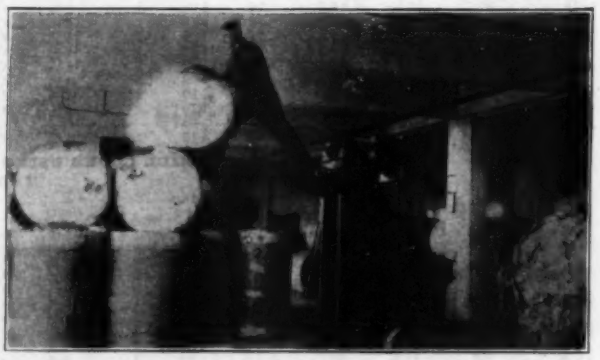


Figure 4

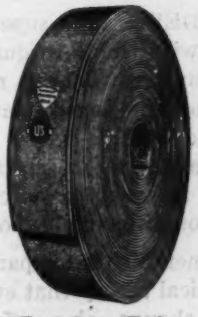
At a high school examination in England the following definition was given of anatomy:

Anatomy is the human body, which consists of three parts, the head, the chist and the stummick. The head contains the eyes and brains, if any. The chist contains the lungs and a piece of liver. The stummick is devoted to the bowels, of which there are five, a, e, i, o, u, and sometimes w and y.

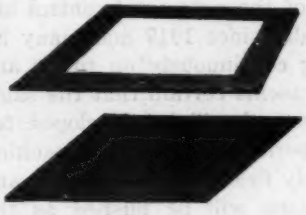
Rubber Goods for the Paper Industry

Rainbow Packing

THE paper trade salesmen and the practical factory men of the United States Rubber Company are qualified through study and experience to recommend the right mechanical rubber goods for any condition existing in this industry.

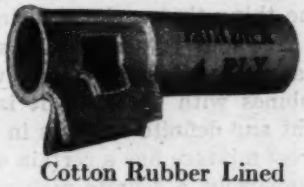


Rainbow Belt



Screen Diaphragms

They are ready to assist paper-mill operators by advising as to the best application of mechanical rubber goods in order that the greatest possible service may be obtained for every dollar invested.



Cotton Rubber Lined Fire Hose

Rubber Covered Rolls

Take advantage of this Company's facilities and experience when in the market for mechanical rubber goods. Through our nearest Branch you can obtain the fullest co-operation of our organization.

Deckle Straps

Rainbow Machine Hose

Rainbow Steam Hose

United States Rubber Company

The World's Largest and Most Experienced Manufacturer of Mechanical Rubber Goods

BELTING	HOSE	PACKINGS	MISCELLANEOUS
Transmission *"Rainbow," "Pilot" "Shawmut"–"Giant Stitched"* **Conveyor** *"United States," "Grainster"* **Elevator** *"Matchless," "Granite," "Grainster"* **Tractor** *"Sawyer Canvas" "Little Giant Canvas"* **Agricultural** *"Rainbow," "Bengal" "Grainster," "Sawyer Canvas"*	**Air** *"4810," "Dexter"* **Steam** *"Rainbow," "Giant," "Perfected"* **Water** *"Rainbow," "Mogul," "Perfected"* **Suction** *"Amazon," "Giant"* **Garden** *"Rainbow," "Mogul," "Lakeside"* Also Hose for Acetylene, Oxygen, Acid, Air Drill, Auto Radiator, Car Heating, Air Brake, Gasoline, Oil, Hydraulic, Chemical, Coke, Creamery, Discharge, Vacuum, Sand Blast, Spray, etc.	**Sheet** *"Rainbow," "Vanda," "Paramo"* **Rod** *"Wizard," "Rainbesta," "Peerless," "Honest John," "No. 573" and hundreds of other styles in coils, rings, gaskets and diaphragms—* **Usco Valves—** THE RIGHT PACKING IN THE RIGHT PLACE	**Mats, Matting and Flooring, Plumbers' Specialties, Rubber Covered Rolls, Friction Tape, Splicing Compd., Dredging Sleeves, Hard Rubber Goods, Printers' Blankets, Tubing, Soles, Heels, Jar Rubbers, Moulded Goods**

US RUBBER SYSTEM — UNITED STATES RUBBER COMPANY AND ASSOCIATED COMPANIES

Automatic Control of Papermill Processes

By P. E. EDELMAN, Consulting Engineer

MODERN mill superintendents are familiar with the good qualities of the acid control system which is marketed under the Edelman Automatic Control patent license in the United States and Canada. As is well known, this is a successful method of controlling electrically such chemical reactions as occur, for example, in the preparation of bi-sulphite of lime.

Fundamentally the apparatus is based on the pure and practical theory that every chemical, physical or thermal change also affects the electrical conductivity of a mixture. The apparatus works to the same thing that a chemical indicator does; that is, the free ions present in the solution. Thus in the usual milk of lime system, where sulphur dioxid combines with the lime, it is desirable to have a slight and definite free gas in the mixture. Such a correct mixture has a certain electrical conductivity, or, inversely, a definite resistance; i. e., the solution has a characteristic electrical condition corresponding to its composition. If now, the amount of free gas is either increased or decreased, there is a corresponding alteration in the electrical characteristic period. Proper apparatus is accordingly designed and used to follow and function on any such changes in the solution, so that, in effect, by suitable mechanism, the reaction is made to automatically and continuously control itself. The free sulphur dioxid, for instance, can be controlled accurately in amount to .02 of one per cent.

Thus, chemistry is turned upside down to the extent that the automatic control works from the result itself and not toward it in uncertain increments following analytical determinations from samples at intervals as in the past. The thing to remember is that the Edelman Automatic Control works just as the chemical indicator in the laboratory, only more delicately and, this is important, continuously. It takes the changes just as they occur and can promptly correct for variations, thus affording a uniform product with minimum labor, and dependable certainty. Maximum volume and rate of flow can accordingly be maintained.

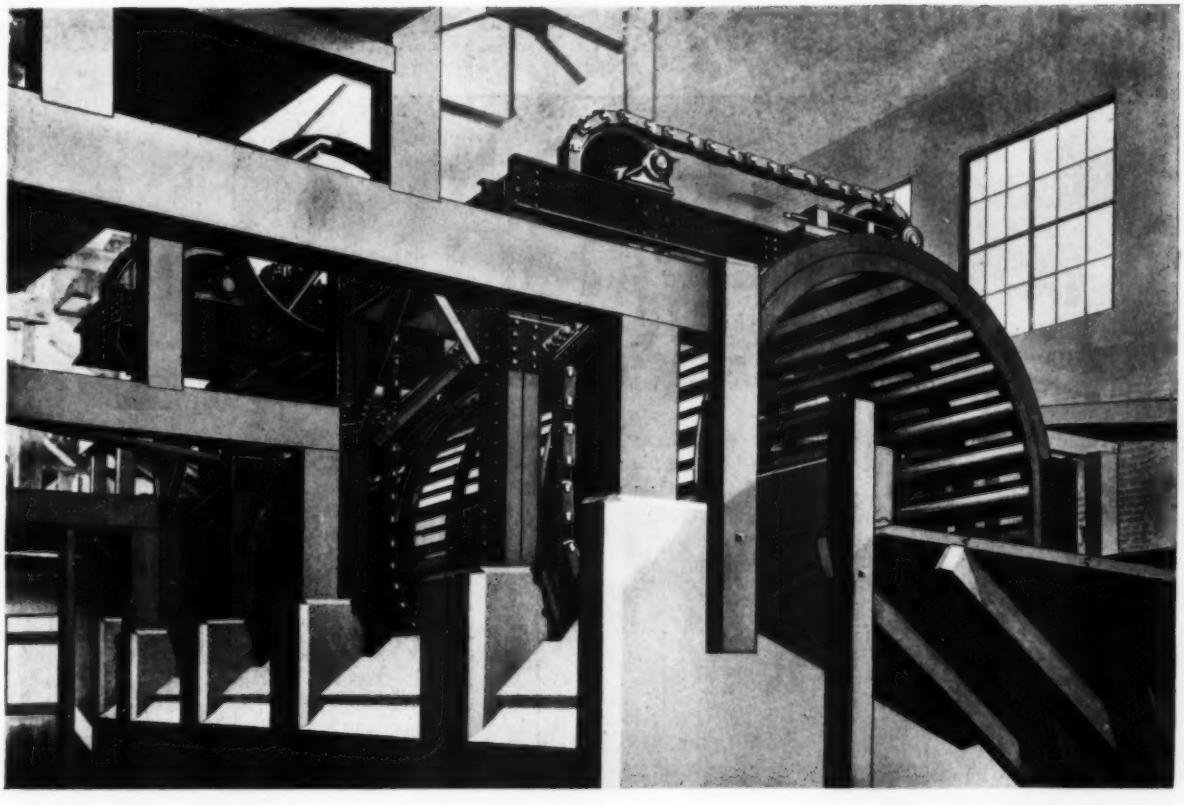
Deposits in the milk of lime system are minimized when this automatic system is attached thereto, because with the proper amount of modifying solution maintained therein continuously to absorb the gases coming in, it is evident that excess deposits are eliminated. The saving is here large because with hand control as in the past, frequent and expensive cleanings, especially in the upper chambers, are a bother. When using the old hand control and set for say 350 total, a drop in gas may occur so that the total becomes only 300, yet you would be feeding in lime, so that a deposit would certainly form. With this system, however, any such drop is automatically followed by a corresponding change in the setting of the modifying solution valve, so that the deposit is obviated. Over a period, it can be appreciated that the automatic method in this respect alone, helps keep good draft on the burners, proper degree of operation with good quantity, as contrasted with steadily decreasing quantity in a plugged hand controlled system which leads to a general clean out or at least a holding back of a digester.

Now that operation of the automatic control has been proven commercially since 1917 and many installations are working continuously on tower and milk of lime system, it seems certain that the same Edelman Automatic Control will be developed for application to other papermill processes. Bleaching operations afford a likely field for this method, and other possible adaptations will be pushed as the demand therefor comes to hand. Already, the invention has been applied with success on a number of important chemical processes, acids, and even organic compounds containing colloidal substances. Prolonged study of plant conditions has permitted a design for the apparatus to meet and obviate objections such as occur to any well versed technical man, so that the operation is continuously dependable.

The equipment is in the nature of an attachment to the present equipment in the mill, though in designing a new mill, a satisfactory lay out can best be made by co-operation of the engineers. The installation to an existing mill is no bother at all, as it is done in each instance by an expert familiar with the new method. As regards economics, the cost of the apparatus is really negligible to any modern mill, as it is rapidly repaid many times over from the savings and resulting improved operation. Even very old mills can profitably consider the new automatic attachment as it can assist materially in keeping in the running with the new and modern ones.

Accessions to the membership list reported at the fall meeting of the Technical Association of the Pulp and Paper Industry number five active, three associate and three junior members. The total membership now amounts to about six hundred.

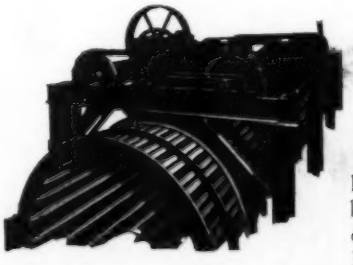
There is only one better man than the man who gets behind and pushes, and that is the man who gets ahead and pulls.—Douglas Malloch.



The cheapest barking drum you can buy on any calculation of the final cost

WHEN have you *ever* regretted buying the *best* of *anything?*

Your entire satisfaction with the barking drum of our manufacture is assured by the production records of a hundred mills, extending over a number of years.

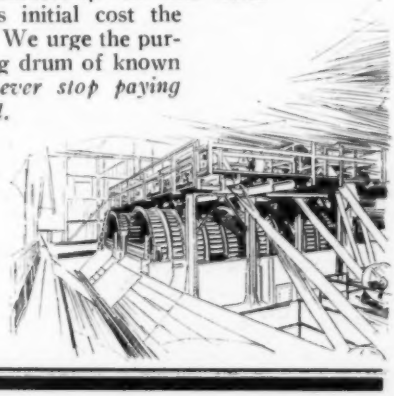


Go through the list of representative users of our equipment. Note how many of them have re-ordered drums of our make. In as many more mills, our drums have supplanted other kinds.

Read what purchasers have to say about our drums. If you can still believe drums of cheaper construction can do as much work, do it as well, do it as long—you are indeed optimistic.

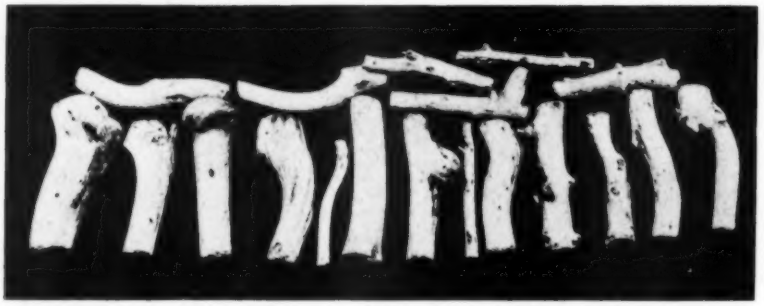
Nor is highest first cost a safe guide. One mill has found that our 10′ x 30′ drum barks within five per cent as much wood as can be handled with a drum of other make in 12′ x 45′ size.

Our drum is the product of years of development—and leadership—in this field. It earns back its initial cost the quickest of any. We urge the purchase of a barking drum of known capacity. *You never stop paying for the other kind.*



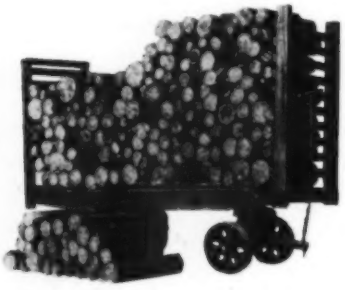
FIBRE MAKING PROCESSES, INC.
TOWER BUILDING
CHICAGO

The best way to bark wood, regardless of cost



PULP manufacturers have long recognized the economies of drum barking. It is, perhaps, the *saving* in this method which has first attracted most mills to its adoption. We would emphasize the fact that drum barking is also the *very best* method, irrespective of costs.

In the very much reduced view above, from a photo of logs just as they emerged from one of our drums, you may still see the absolute cleanness of barking. You can see that crooked, knotty wood has fared no different from the rest.



No method of barking except *tumbling* could produce such result. And tumbling is done most thoroughly with our drums, as we can conclusively show.

The view of a log which was removed from our drum before it had progressed far in the process, shows how *naturally* the bark is removed by this frictional process. There is no evidence of bruising—nor would there be had the log gone several times through our U-bar drum of any length. Nor do you find any loss of good wood—only the bark can come off.

Your bark, similarly, is *all bark*, when our equipment is used. It is easily handled with our bark press (described further on) and suitable for fuel.

Our drum handles wood in slabs as well as logs.

The most economical method, by far

IT is to be regretted that figures are not available as to net money-savings annually by all the mills using barking drums. Also, actual figures to show what savings are possible through use of our equipment compared with the next most efficient drums.

Drum barking saves about one-sixth of the wood itself, over the most efficient of all other methods. All of the wood goes into pulp, because *none* is taken off with the bark. So, about one-sixth of your annual wood bill is to be calculated in the saving from use of a barking drum.

With our drum, we repeatedly accomplish barking which requires fourteen men to bark by hand—and but two men are needed to operate our drum. The labor-saving is thus large enough to offset every expense incident to installation of a barking drum in a very few months.

There is, in addition to the direct-money-saving of a single man in place of seven men engaged in knife-barking, the advantage of *known capacity*. Other departments, dependent for production on a certain volume of barked logs, are assured that volume when the barking operation is one easily handled by a few men, of no special aptitude.

Our drum is also used for washing the wood which has already been peeled in the woods.

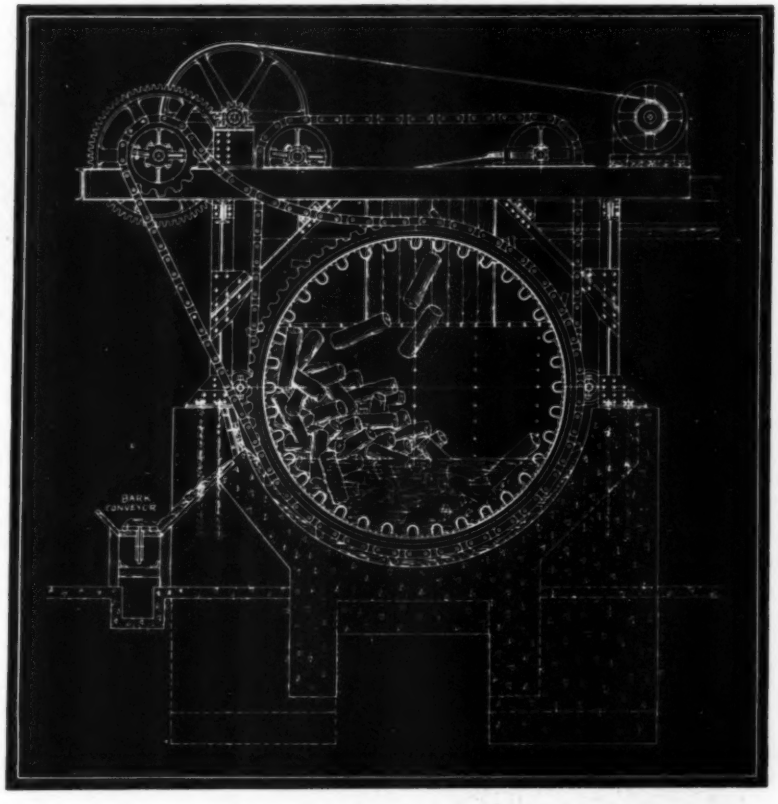
On receipt of information as to your average production, quantity of wood handled, kind, etc., we can give you reliable estimates of savings our drums could effect in your mill.

An obviously superior principle of operation

BRIEFLY described, the operation of barking in our drum is as follows:

The drum is suspended perfectly level, the wood discharging at the same rate as fed into front end. The wood that is fed, crowds the contents along. The feeding is automatic, because the pile tends toward taking a horizontal position.

Our U-bars are so spaced as to present the right surface for "picking up" and tumbling the wood. The bark removed drops between these longitudinal bars into a cylindrical tank. Scrapers—or paddles—outside of drum take the bark to a conveyor.



Perfect tumbling without bruising

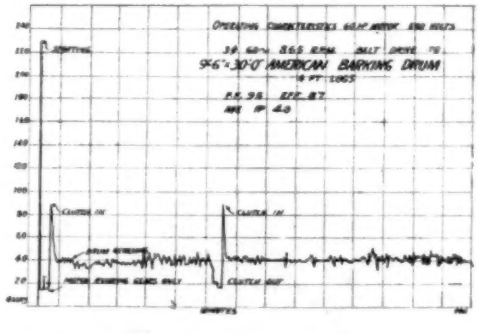
You have but to stand at the discharge end of one of our drums to see that the wood is barked clean—*and without any bruising.* The U-bars present the needed irregularity of surface, with no sharp projections which mutilate.

The diameter, length, rotating speed accomplish an easy, natural barking, just as when logs are run down the river. Drum is open at both ends, partly submerged in water, regulated by a dam at the end of the vat—usually of concrete.

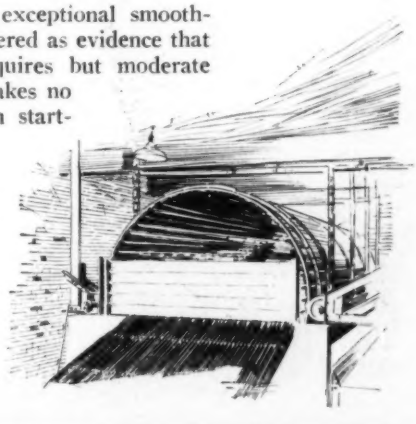
Because our drums do such rapid and perfect barking of both slabs and logs, we prefer that those interested in such equipment see them in actual operation.

Minimum power requirement

An interesting power diagram is offered to the left. It is the actual record from the instrument measuring the power load in a mill where our drum is operated.



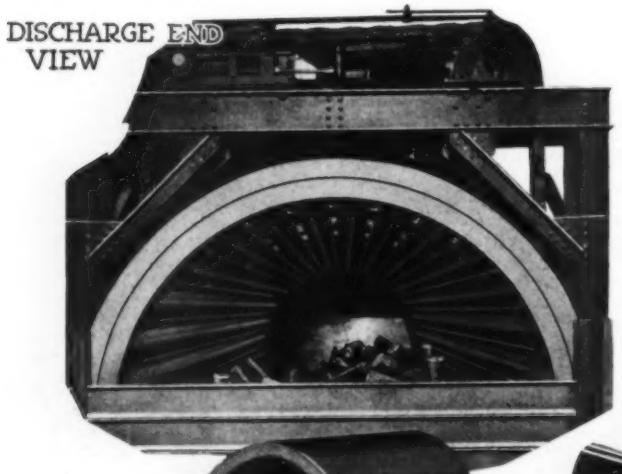
You will observe the exceptional smoothness of load. This is offered as evidence that our drum not alone requires but moderate power under way, but makes no violent power demand in starting, or in gaining momentum.



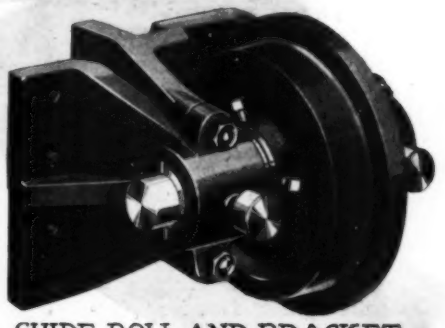
The first running of our drum—particularly in a mill where other rotary barking machinery has been in use—is always a surprise in this feature of smooth operation. It is due in great measure to the principles of drive and suspension.

In spite of its heavy load, our drum will revolve—stop—start—with less apparent stress and strain than seemed possible.

Constructional advantages that are unique

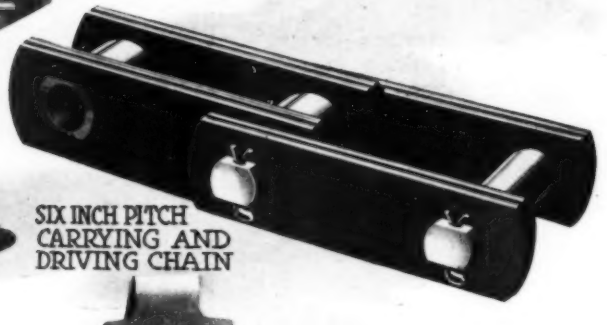


DISCHARGE END VIEW

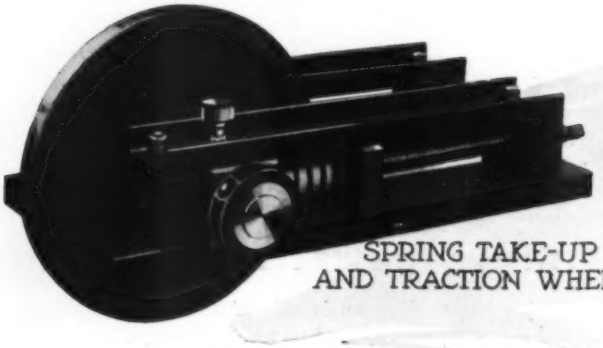


GUIDE ROLL AND BRACKET

SECTION OF U-BAR



SIX INCH PITCH CARRYING AND DRIVING CHAIN



SPRING TAKE-UP AND TRACTION WHEEL

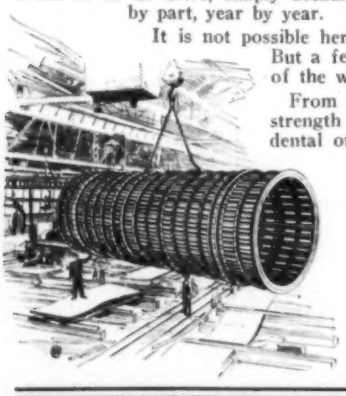
SPROCKET SECTION SHOWING CHILLED RIM

DRIVE SPROCKET

A BARKING drum is a heavy-duty machine. One weak spot in its design or construction will upset every other calculation. There are no weak points in our drum or in its drive, simply because we have developed strength in our drum—part by part, year by year.

It is not possible here to picture the inherent strength of our drum. But a few important details, pictured above, are indicative of the way we have stressed the factor of *strength*.

From intake to discharge, we have attained such strength of design as to have overcome all but accidental or extraordinary breakage.



Notice the smooth, flat ring forming the drum end; free from bolt ends, or rivet heads which would offer leverage for log ends.

The famous U-bar, in addition to its securance of tumbling without bruising the wood, is many times stronger than an angle-bar.

Uncommon strength of both guideroll and bracket maintains the true guidance of the drum under any stress of load.

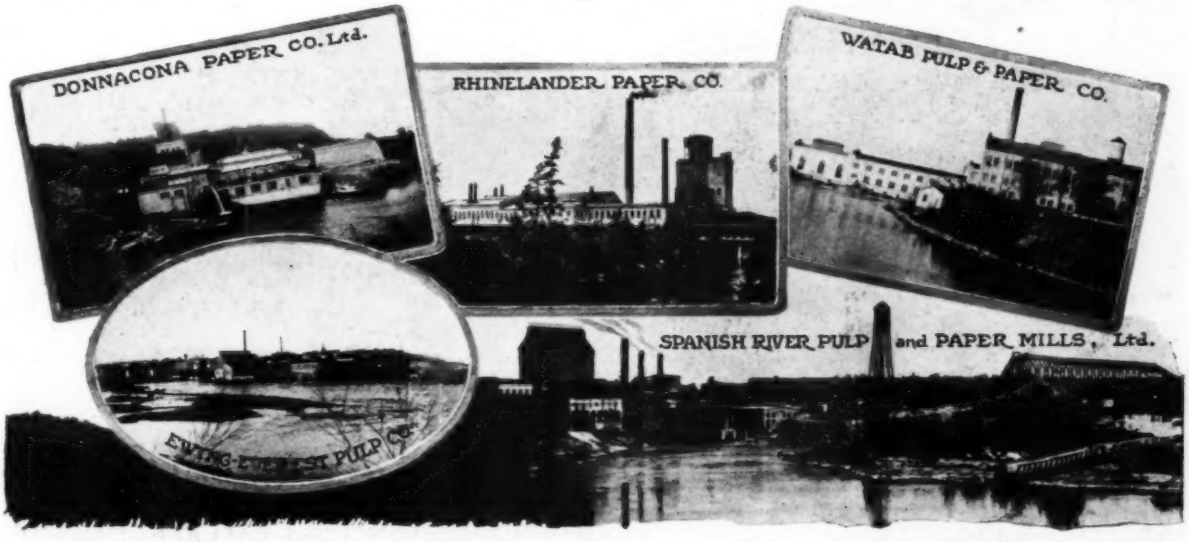
We use a chain for the carrying and driving of our drum which has proven unbreakable so far as we know. Contrast this design with other drive chain.

Our spring take-up and traction wheel offsets any amount of wear and is adequately strong.

See the section of sprocket, broken to show the thickness of chill at the rim (indicated by the light portion).

Drive sprockets on our drums *resist breakage*. Notice how they are hardened.

Proof of our leadership in barking equipment



Observe long list of representative mills using our drums—in order of purchase. Figures in parentheses tell how many drums. Those marked thus (*) have *re-ordered* our equipment.

Escanaba P. & P. Co., Escanaba, Mich..... (1)
Spanish River Pulp & Paper Mills, Ltd., Espanola, Ont. ..... (1)
Island Paper Co., Menasha, Wisc..... (1)
Ontario Paper Co., Thorold, Ont..... (1)
Nekoosa-Edwards Paper Co., Port Edwards, Wisc. ..... (2)
Marathon Paper Mills Co., Rothschild, Wisc. ..... (1)
Riordan P. & P. Co., Haileybury, Ont..... (1)
Pejepscot Paper Co., Great Salmon River, N. B. ..... (1)
Rhinelander Paper Co., Rhinelander, Wisc. (2)
*Lake Superior Paper Co., Sault Ste. Marie, Ont. ..... (5)
*Nekoosa-Edwards Paper Co., Port Edwards, Wisc. ..... (1)
*Nekoosa-Edwards Paper Co., Nekoosa, Wisc. ..... (1)
Thilmany P. & P. Co., Kaukauna, Wisc..... (1)
Riverside Fibre & Paper Co., Appleton, Wisc. ..... (1)
Interlake P. & P. Co., Appleton, Wisc..... (1)
Munising Paper Co., Munising Mich..... (1)
*Marathon Paper Mills Co., Rothschild, Wisc. ..... (1)
*Spanish River Pulp & Paper Mills, Ltd., Espanola, Ont. ..... (1)
Watab Pulp & Paper Co., Sartell, Minn..... (1)
St. Anne Power Co., Beaupre, Que..... (1)
Dells Paper & Pulp Co., Eau Claire, Wisc. (1)
*Spanish River Pulp & Paper Mills, Ltd., Sturgeon Falls, Ont. ..... (3)
Chicoutimi Pulp Co., Chicoutimi, Que..... (1)
Cornell Wood Products Co., Cornell, Wisc. (2)
Wisconsin River Paper & Pulp Co., Stevens Point, Wisc. ..... (1)
Fitzdale Paper Co., Fitzdale, Vt..... (1)
Flambeau Paper Co., Park Falls, Wisc..... (1)
*Riverside Fibre & Paper Co., Appleton, Wisc. ..... (1)
Itasca Paper Co., Grand Rapids, Minn..... (1)
Eastern Mfg. Co., Lincoln, Me..... (1)
*Interlake P. & P. Co., Appleton, Wisc..... (1)
Abitibi Power & Paper Co., Iroquois Falls, Ont. ..... (4)
Wayagamack Pulp & Paper Co., Three Rivers, Que. ..... (2)
St. Maurice Paper Co., St. Gabriel, Que.... (2)
St. Maurice Paper Co., Three Rivers, Que.. (2)
St. Maurice Paper Co., Charlemagne, Que.. (1)
Central Paper Company, Muskegon, Mich.. (1)
Inland Empire Paper Co., Millwood, Wash. (1)
Kingsport Pulp Corp., Kingsport, Tenn..... (1)
Powell River Co., Powell River, B. C..... (1)
New York & Dominion Corp., Roberval, Que. (1)
Nashwask P. & P. Co., St. John, N. B..... (2)
West Virginia P. & P. Co., Cass, West Va. (2)
Filer Fibre Co., Manistee, Mich..... (1)
Donnacona Paper Co., Donnacona, Que..... (1)
*Pejepscot Paper Co., Great Salmon River, N. B. ..... (1)
Fraser Companies, Ltd., Edmundston, N. B. ..... (2)
Mount Tom Sulphite Pulp Co., Mount Tom, Mass. ..... (1)
Detroit Sulphite Pulp & Paper Co., Detroit, Mich. ..... (2)
Manistique P. & P. Co., Manistique, Mich.. (1)
Northwest Paper Co., Cloquet, Minn..... (2)
*Riverside Fibre & Paper Co., Little Rapids, Wisc. ..... (1)
Burgess Sulphite Fibre Co., Berlin, N. H. (2)
Union Bag & Paper Corp., Hudson Falls, N. Y. ..... (2)
*Burgess Sulphite Fibre Co., Berlin, N. H. (2)
St. Croix Paper Co., Woodland, Me..... (1)
*Burgess Sulphite Fibre Co., Berlin, N. H. (2)
*St. Croix Paper Co., Woodland, Me..... (2)
*Lake Superior Paper Co., Sault Ste. Marie, Ont. ..... (2)
Brompton Pulp & Paper Co., Bromptonville, Que. ..... (1)
Port Arthur P. & P. Co., Port Arthur, Ont.. (1)
*Spanish River Pulp & Paper Mills, Ltd., Espanola, Ont. ..... (1)
*Ewing-Everest Pulp Co., Merrill, Wisc..... (1)
*Chicoutimi Pulp Co., Ouiatchouan Falls, Que. (1)
*Chicoutimi Pulp Co., Chicoutimi, Que..... (1)
St. Regis Paper Co., Deferiet, N. Y..... (1)
St. Lawrence Pulp & Lbr. Co., Chandler, Que. ..... (2)
P. H. Galtfelter Co., Spring Grove, Pa..... (1)
News P. & P. Co., St. Raymond, Que..... (1)
Nekoosa-Edwards Paper Co., Port Edwards, Wisc. ..... (1)
Finch, Pruyn Co., Glens Falls, N. Y..... (1)
*Powell River Co., Powell River, B. C..... (1)
Belgo-Canadian Pulp & Paper Co., Shawinigan Falls, Que..... (4)
New York & Pennsylvania Co., Johnsonburg, Pa. ..... (1)
York Haven Paper Co., York Haven, Pa.... (1)
*Pejepscot Paper Co., Brunswick, Me..... (2)
*Union Bag & Paper Corp., Cheboygan, Mich. ..... (1)
Mattagami Pulp & Paper Co., Smooth Rock Falls, Ont. ..... (2)
S. D. Warren & Co., Cumberland Mills, Me. (1)
*New York & Pennsylvania Co., Johnsonburg, Pa. ..... (1)
*Lake Superior Paper Co., Sault Ste. Marie, Ont. ..... (2)
Dare Lumber Co., Elizabeth City, N. C..... (1)
Whyte-Campbell Lumber Co., Rawdon, Que. (1)
Ontario Paper Co., Thorold, Ont..... (1)
*St. Regis Paper Co., Deferiet, N. Y..... (1)
Bedford P. & P. Co., Coleman Falls, Va.... (1)
*Port Arthur P. & P. Co., Port Arthur, Ont. (1)
Chesapeake Corp., West Point, Va..... (1)
Crown-Willamette Paper Co., Camas, Wash. (1)
*Donnacona Paper Co., Quebec..... (1)
*Escanaba Paper Co., Escanaba, Mich..... (1)
Bathurst Lbr. Co., Bathurst, N. B..... (2)
*Flambeau Paper Co., Park Falls, Wis..... (2)
Spanish River Pulp & Paper Co., Sault Ste. Marie, Mich. (making their sixteenth drum) ..... (1)
Schroon River Pulp & Paper Co., Warrensburg, N. Y. ..... (1)
*Fraser Companies, Ltd., Edmundston, N. B. ..... (2)
*Fraser Companies, Ltd., Cabano, Que..... (1)
San Rafael Paper Co., Mexico City, Mex..(1)
*Interlake P. & P. Co., Appleton, Wis..... (1)
Nekoosa-Edwards Paper Co., Port Edwards, Wis. ..... (1)
Gulf P. & P. Co., Clarke City, Que..... (1)
J. & J. Rogers Co., Au Sable Falls, N. Y. (1)
*Union Bag & Paper Corp., Hudson Falls, N. Y. ..... (2)
Cushnoc Paper Co., Augusta, Me..... (1)
A. E. Reed & Co., Bishop Falls, N. F..... (1)
Hinckley Fibre Co., Hinckley, N. Y..... (1)
*Spanish River Pulp & Paper Mills, Ltd., Sturgeon Falls, Ont. ..... (1)
Northern Paper Mills, Ltd., Green Bay, Wisc. ..... (1)
*Fraser Companies, Ltd., Chatham, N. B..... (2)
Groveton Paper Co., Groveton, N. H..... (1)
*Detroit Sulphite Pulp & Paper Co., Detroit, Mich. ..... (1)
*Abitibi Power & Paper Co., Iroquois Falls, Ont. ..... (4)
New Ontario Colonization Co., Jacksonboro, Ont.....(1)
St. Regis Paper Co., Oscalana, Que. ..... (1)
*Consolidated Water Power & Paper Co., Grand Rapids, Wis. ..... (2)

A typical experience with our barking drum

PEJEPSCOT PAPER COMPANY
MANUFACTURERS OF PULP, PAPER AND LUMBER
111 BROADWAY
NEW YORK

Mr. H. W. Guettler,
Dear sir: February 18, 1918

One of your drums installed at our preparing plant on the bay of Fundy, New Brunswick, has been in operation two years. The other, built especially to handle slabs, for one year.

We find no difficulty in removing bark from slabs or pulpwood, perfectly.

Personally, I do not believe any manufacturer can live in business and prepare wood by the old method of disc barking, or peeling in the forest.

We have found your drum satisfactory in all its details. I recommend without hesitation the barking drums of your manufacture.

Yours very truly,

PEJEPSCOT PAPER COMPANY
MANUFACTURERS OF PULP, PAPER AND LUMBER
111 BROADWAY
NEW YORK July 1, 1920

Mr. H. W. Guettler,
Dear sir:

I am very glad to inform you regarding the two drums we had you install in our Pejepscot mill, in Maine, a year ago.

We have had most successful results. We put through a total of 13,000 pieces of 4-ft. wood in eight hours. Now, you can estimate what this means in cordage.

These two drums are perfect in construction, and perfect in operation. I would be very glad if your representative could arrange to meet me sometime in Maine, and see these drums in operation.

With my kindest regards,

I am,

Very truly yours,
President

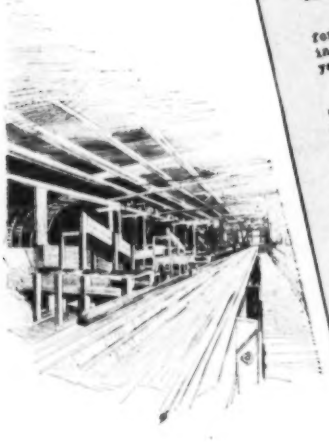
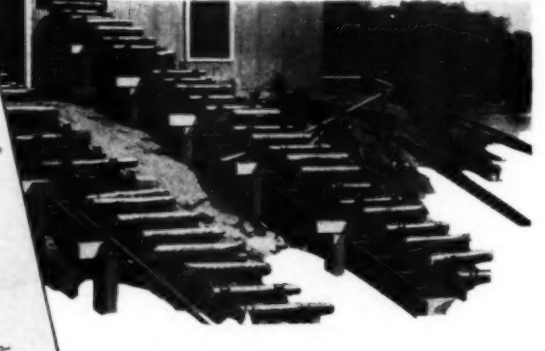


Illustration above is of an installation made by us for the Pejepscot company, the efficiency of which is told by their president's two letters, here reproduced.

There is double significance to Pejepscot's commendation of our equipment. Their first commendatory letter is followed by another, telling of just as successful results from other of our installations.

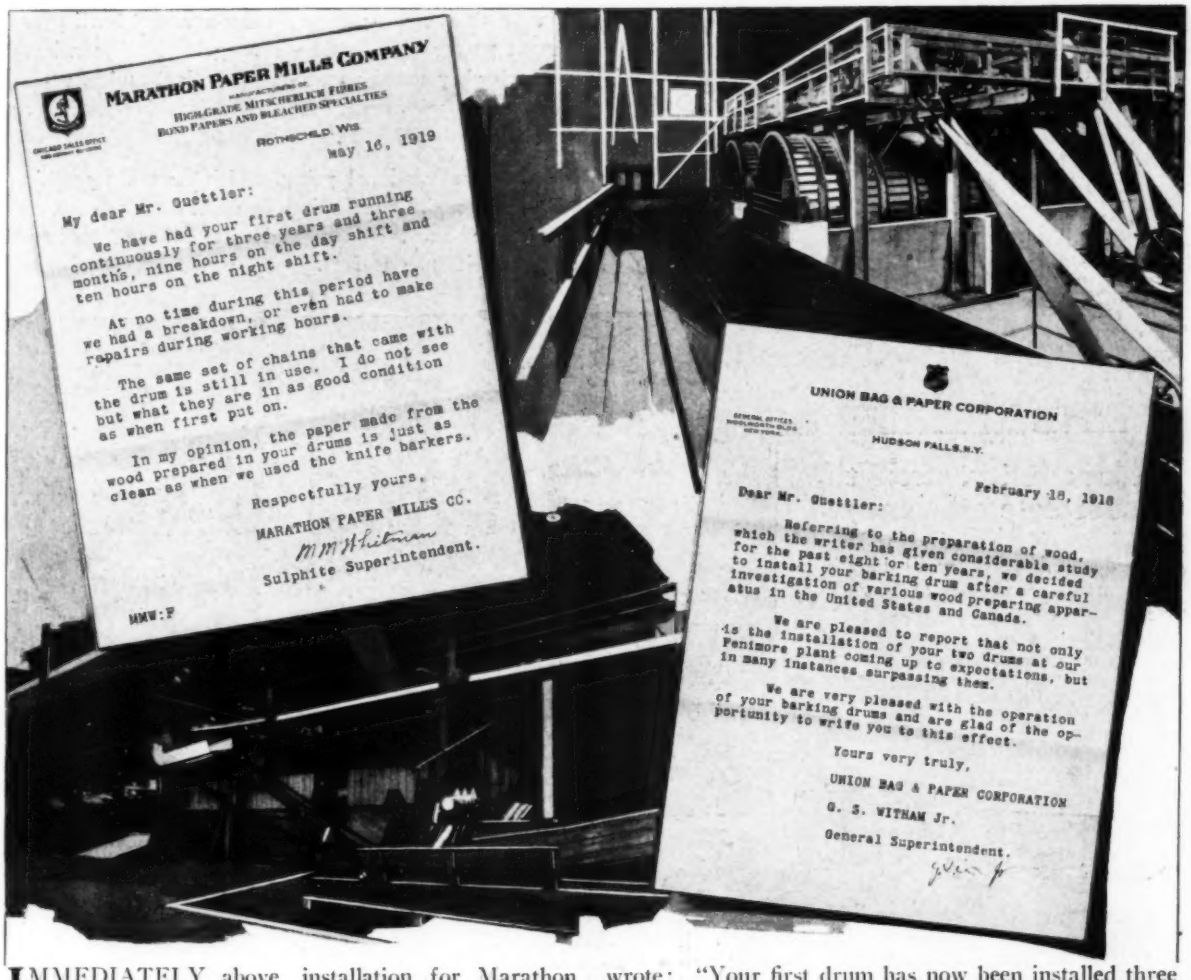


Many letters like these

We think letters of this character carry weight. We have a great many such evidences of the superiority of our drums.

The Abitibi Power and Paper company after a recent inspectional tour decided in favor of our equipment as our list of users will reveal. They bought four drums.

Testimony of two representative paper mills


MARATHON PAPER MILLS COMPANY
HIGH-GRADE SULPHITE AND BLEACHED SPECIALTIES
BOND PAPERS AND BLEACHED SPECIALTIES
ROTHSCHILD, WIS.
May 16, 1919
My dear Mr. Guettler:
We have had your first drum running continuously for three years and three months, nine hours on the day shift and ten hours on the night shift.
At no time during this period have we had a breakdown, or even had to make repairs during working hours.
The same set of chains that came with the drum is still in use. I do not see but what they are in as good condition as when first put on.
In my opinion, the paper made from the wood prepared in your drums is just as clean as when we used the knife barkers.
Respectfully yours,
MARATHON PAPER MILLS CO.
Sulphite Superintendent.
MMW:F
UNION BAG & PAPER CORPORATION
HUDSON FALLS, N.Y.
February 18, 1918
Dear Mr. Guettler:
Referring to the preparation of wood, which the writer has given considerable study for the past eight or ten years, we decided to install your barking drum after a careful investigation of various wood preparing apparatus in the United States and Canada.
We are pleased to report that not only is the installation of your two drums at our Penimore plant coming up to expectations, but in many instances surpassing them.
We are very pleased with the operation of your barking drums and are glad of the opportunity to write you to this effect.
Yours very truly,
UNION BAG & PAPER CORPORATION
G. S. WITHAM Jr.
General Superintendent.

IMMEDIATELY above, installation for Marathon mills at Rothschild, Wisconsin, U. S. A. This is our 10′ x 30′ size drum.

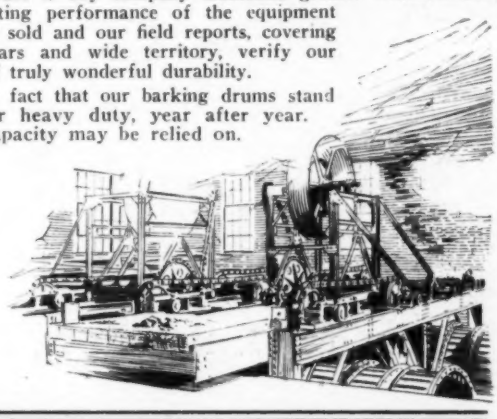
We cannot assure purchasers of our drums that they will never experience a breakdown. But Mr. Whitman's letter proves that years of uninterrupted service *is possible* with equipment designed as well.

The Union Bag and Paper mills at Hudson Falls, New York, U. S. A., their letter and a view of our drums installed at their plant appearing above, have repeatedly expressed satisfaction with our equipment. Under date of August 6th, 1920, the Donnacona mills wrote: "Your first drum has now been installed three years. The new one has been running for a month. We are well satisfied, as they are barking *six hundred cords of wood in twenty hours, practically clean, without the use of return conveyors.*"

The item of repairs almost negligible

We doubt if any company maintains greater watchfulness of operating performance of the equipment built and sold and our field reports, covering many years and wide territory, verify our claims of truly wonderful durability.

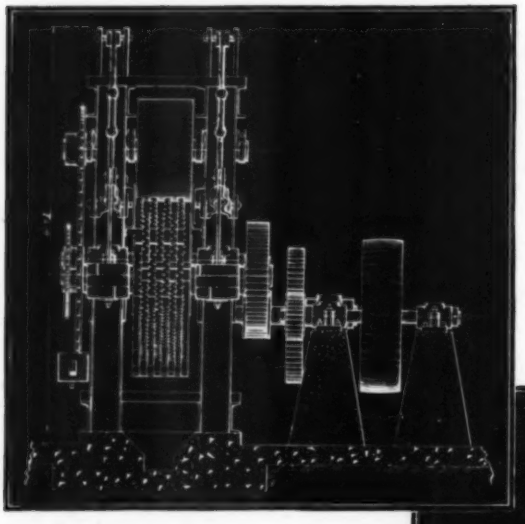
It is a fact that our barking drums stand up under heavy duty, year after year. Their capacity may be relied on.



We study the individual requirements

With what is doubtless the largest aggregate experience in the field, we nevertheless approach each new installation of our drums with the most careful investigation and study of *the exact conditions to be met.*

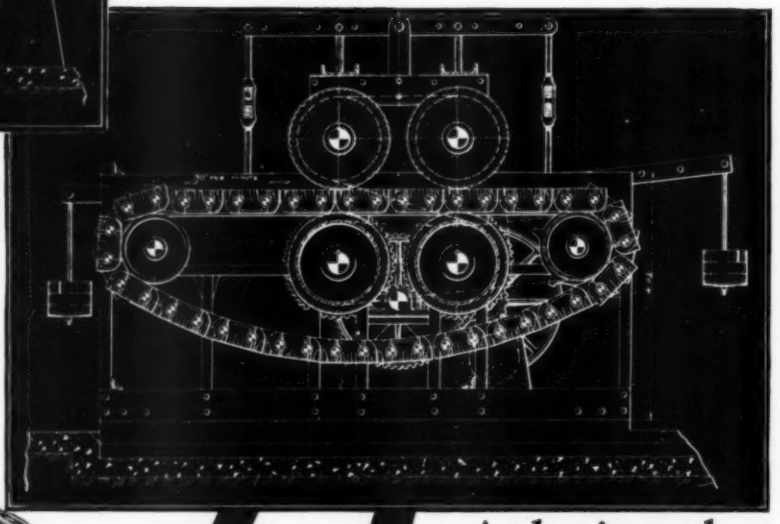
Our drum is sold not merely as a device, but as a means to accomplish certain work to be done—in *your* mill, and under *your own* manufacturing conditions. We will gladly undertake a survey of your properties, and report specifically. Please feel free to request the information we are pleased to give.



Choosing a bark-press

AS with the barking drum, the successful bark press must possess tremendous strength. Mill men have found our bark presses peculiarly practical and effective for the heavy work which is entailed in the pressing of bark of varying thickness.

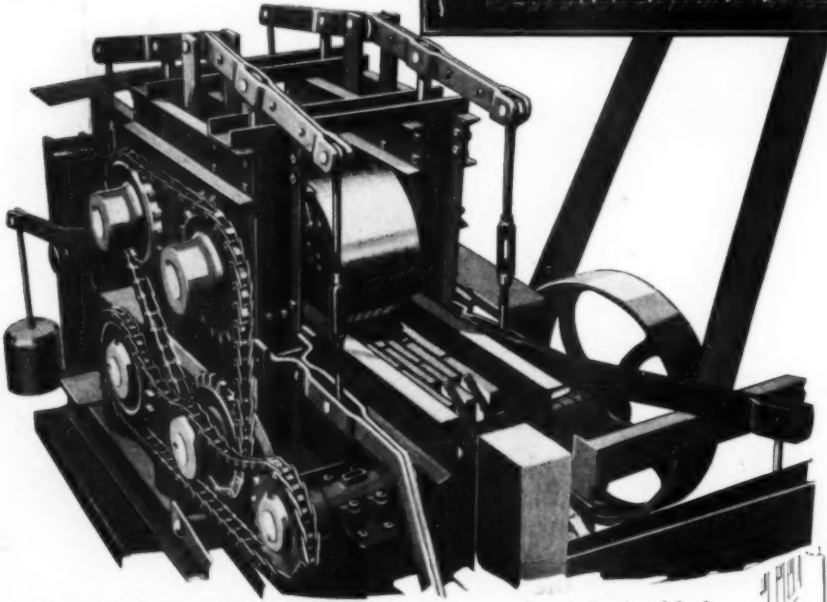
We show constructional prints which convey something of the solidity and simple principle of our bark press. It handles bark of any thickness, and takes sufficient moisture out to permit its use as fuel.



Adaptability, strength, complete efficiency

A thoroughly practical press, of great durability, that will handle a great quantity of bark of any character.

Horizontal apron of extra heavy stoker chain, running between a double set of press rolls. The rolls move up or down as the thickness of bark varies, weights and levers both sides of bearings exerting the necessary pressure for thorough, effective work.



A design that resists wear

Many refinements of design make this a most satisfactory choice of press. An example is the stops on top roll bearings which prevent wear between rolls and apron when running free from bark.

We earnestly solicit investigation of this design before the purchase of any press for this kind of work.

Complete information on any of our equipment is gladly furnished. Particularly do we invite submission of facts and figures on your specific requirements, on which we may base dependable data, prices, etc.

FIBRE MAKING PROCESSES, INC.
TOWER BUILDING . . . . . CHICAGO

You Buy the Highest Type of Electrical Protection

in any circuit when you install Economy Renewable Fuses—made in both ferrule and knife-blade types in all capacities.

Accurate rating, practical, safe fuse construction and a dependability which has been proved for years in thousands of industries, large and small, make Economy Fuses first choice where efficiency is the first consideration.

Ferrule type with Economy "Drop-Out" Renewal link.

Knife-blade type with Economy "Drop-Out" Renewal link.

ECONOMY *renewable* FUSES

And You Cut Fuse Maintenance Cost 80%

compared with the maintenance cost of any "one time" fuse equipment.

Only the "Drop-Out" Renewal Link is destroyed when the fuse blows.

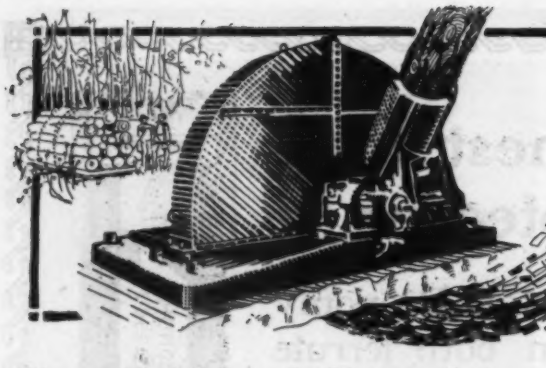
Both ferrule and knife-blade types are easily and quickly restored without expensive delay in service.

Economy was the first line using inexpensive bare renewal links for restoring blown fuses to their original efficiency to be APPROVED IN ALL CAPACITIES by the Underwriters' Laboratories.

Sold by all leading electrical jobbers and dealers

Economy Fuse & Mfg. Co., Chicago, U. S. A.

Economy Fuses are also made in Canada at Montreal

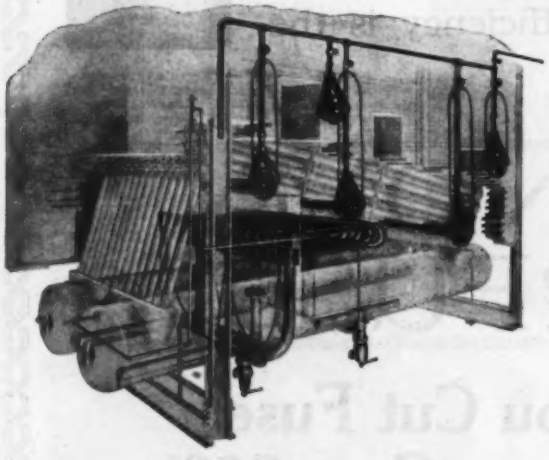


Chips of Information

Clean Tubes and Cheap Steam

Of all the preventable losses in steam production, the covering of the fire surfaces of the boiler with soot is probably the most troublesome. Furthermore, the action is continuous, and cannot be stopped by any permanent means.

Soot is almost the best insulator known. In non-conductive properties, it has proved to be more than



five times as effective as fine asbestos. More heat would be transmitted to boiler tubes through a full one-inch wrapping of asbestos than through one-fifth inch coating of soot.

There are two methods of soot removal: the use of the hand hose; and the installation of mechanical soot blowing systems. The former has been rapidly supplanted by mechanical apparatus in recent years, so that the use of hand hose is now found only in small, outlying, or obsolete plants.

The mechanical soot blower has been developed for all types of boilers. For the water tube boiler, the apparatus consists of a system of revolving units placed cross-wise of the bank of tubes of the boiler at effective locations. Cleaning is maintained by means of high velocity steam jets which reach every nook of the boiler when the unit is revolved, thoroughly removing all soot and ash deposits.

Soot blower designers have had to contend with, in the main, two dissimilar problems. One had to do with securing high velocity of steam flow through small orifices and minimization in the use of steam. After much experimentation, the Venturi principle was applied to blower jets. The nozzles vary in design for different pressures. The expanding walls of the Venturi nozzle increase the velocity of the steam over 200 per cent as compared with a nozzle having a straight orifice. Thus, the velocity of the steam issuing from a straight nozzle at 150 lbs. pressure is 912 feet per second, whereas, at this pressure the velocity of the steam issuing from a Venturi nozzle is 2,795 feet per second.

At first (and this recalls the second engineering problem in connection with the design and installation of mechanical soot blowers) the blowing elements which entered the interior of the boiler were protected against the fierce, oxidizing heat by sheaths of concentric iron or tile tubes. Some manufacturers used this method. Others sought to get away from the hot gases by locating strategically the blower elements in the coolest passes, or by protecting them with special baffles, and the like.

The first method proved cumbersome; in time the weight of metal or tile on the blower element caused it to sag and become inoperative. The second means proved better, but the efficiency of the blowers was reduced by the fact that only the coolest passes of the boiler were cleaned; that is, the hot passes were foreign to the reach of the jets.

The special, protecting baffles proved to be a source of annoyance in times of repair, since they obstructed the pulling of tubes, etc. Further, the cost of replacement was high.

In 1911 the research laboratories of the General Electric Company perfected what is now known as the "Calorizing Process." By its use iron, steel, and other metals are fire-proofed against oxidation at high temperatures by treating them with aluminum. The aluminum enters into the iron so intimately that an homogeneous alloy is formed (ferro-aluminum). Calorized metal will withstand high temperatures up to 1800 deg. F. Ordinary iron or steel will oxidize at 1100 deg. F.

The modern soot blower, mechanically perfect, perfect as to efficiency by reason of the use of Venturi nozzles, and long-lived because of its Calorized blower elements, pays for itself in from 6 to 12 months of use.

Modern Pulp and Paper Making

A Practical Book for Paper Makers

By G. S. WITHAM, SR.

The first practical book by an acknowledged authority on the manufacture of pulp and paper as it is carried on in America today.

A Few Things the Book Tells:

The properties of the principal woods and other raw materials used for paper.

The qualities, grades and requirements of all the different varieties of paper.

How a Fourdrinier machine is built and operated—in great detail.

What happens to the fibres in the beater.

How to make good ground wood economically.

How to cook sulphite pulp and make and reclaim acid.

The use of clay, size, alum, colors, etc.

How much power is required for every piece of equipment in a pulp and paper mill.

How to install a system of tests and records to keep production up to standard.

Actual complete specifications for Fourdrinier machines, beaters, Jordan engines, grinders.

All the newer developments in paper mill engineering and equipment such as suction couch and press rolls, individual electric drive for Fourdrinier machines, waste paper utilization, electric regulators for grinders, automatic dryer temperature control, weaving devices, Claflin engines, save-all installations, etc.

How to put on a new wire.

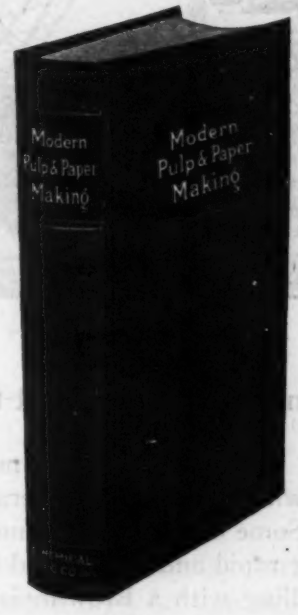
How to care for wet felts, dryer felts, deckles, etc.

How to start up a Fourdrinier machine.

How to install and operate a saw-mill.

How to detect the causes of breaks and defects and how to remedy them.

How to calculate the retention of clay, etc., etc.



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Each piece of equipment is described in detail. Minute instructions for operating every machine. More than 200 illustrations from photographs, charts and diagrams. A complete, practical, treatise on pulp and paper manufacture from the saw-mill to the finishing room. Written in simple, plain language by a man who has gone through the very experiences you are going through—or will go through—to reach the top.

Book Department

The CHEMICAL CATALOG COMPANY, *Inc.*

Publishers of the Chemical Engineering Catalog

MADISON AVENUE, NEW YORK, U. S. A.

BROWNHOIST

Handling Materials at the Mill

IS YOURS one of the many mills which handles considerable pulp? Some of these have found it to be more rapid and economical to do this handling with a Brownhoist locomotive crane. A Brownhoist will not only place the pulp wherever it is needed, but will handle your coal, switch the cars and take care of innumerable jobs which come up around the yard. If you have much handling to do, our long crane experience should be of use to you. We will gladly give you any information for the asking.

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Brown Hoisting Machinery Co.
CLEVELAND, OHIO, U.S.A.

Engineers and Manufacturers of Heavy Dock Machinery, Bridge Cranes, etc., as well as smaller Cranes and Hoists

Branch Offices in New York, Pittsburgh, Chicago and San Francisco.

Comparative Value of Timber Cut from Live and Dead Trees

Prejudice exists in certain quarters against the use of timber cut from dead trees, and some purchase specifications insist that only timber cut from live trees will be acceptable. As a matter of fact, when sound dead trees are sawed into lumber, and the weathered or charred outside is cut away, there is no method known to the Forest Products Laboratory by which the lumber can be distinguished from that cut from live trees, except that the lumber from dead trees may be partly seasoned when sawed.

All the information available at the laboratory indicates that timber cut from insect or fire killed trees is just as good for any structural purpose as that cut from live trees of similar quality, providing the wood has not been subsequently injured by decay or further insect attack. If a tree stands on the stump too long after it is killed, the sapwood is likely to become decayed or badly infested by wood-boring insects; and in time the heartwood also will be similarly affected. The same thing is true of logs cut from live trees and not properly cared for. Until the wood becomes affected by these destructive agents, dead tree wood should be just as strong and just as durable as sound live tree wood.

In considering the subject it may be useful to remember that the heartwood of a living tree is entirely dead, and in the sapwood only comparatively few cells are living. Most of the wood cut from trees is dead, therefore, regardless of whether the tree itself is living or not. Such being the case, purchase specifications, instead of providing that material must not be from dead trees, should state that material showing evidence of decay or insect infestation exceeding a specified limit will not be accepted.

Light Creosote Oils in Wood Preservation

Light creosote oils properly injected into wood apparently will prevent decay until the wood wears out or until it checks so badly that the untreated portions are exposed. Such is the indication of service records collected by the Forest Products Laboratory on railway ties and telegraph poles preserved with low boiling creosotes.

Creosotes used in ties from 25 to 50 years ago were for the most part oils having 50 per cent or more distilling below 235°C., with a residue not to exceed 25 per cent at 315°C. The ties so treated lasted from 15 to 20 years, and failure was traceable in most cases to mechanical wear, such as rail cutting and spike killing. In no case was failure found to be the fault of the preservative.

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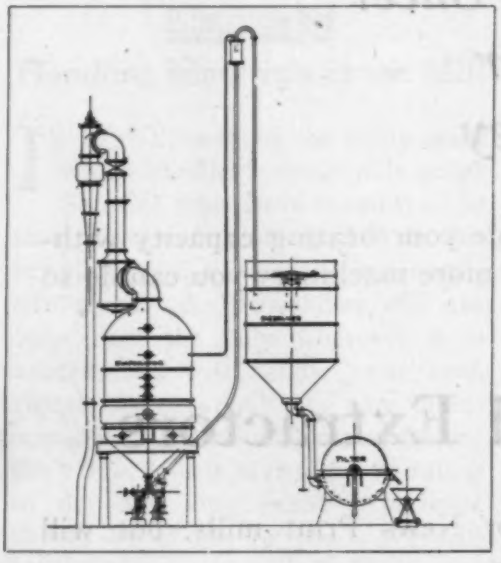
THIS apparatus, backed by a number of years of successful service, is intended to make what is now generally an intermittent operation continuous, and in a large sense automatic. Moreover, the apparatus is of a character requiring no more attention than can be given it by the man in charge of the evaporator. In other words, it can be operated without extra labor.

One of the most important features is that it permits continuous operation of evaporators



without periodic drawing off and refilling, consequently it contributes to minimum steam consumption by doing away with the intermittent cooling and reheating of batch charges as drawn into the evaporators.

Glamorgan Pipe & Foundry Co.

Lynchburg, Va., U. S. A.

Of 1,558 telegraph poles in the Montgomery-New Orleans line, which were pressure-treated with a light creosote oil, 1,049 poles were still sound after 16 years. In 91 per cent of the cases of decay, the fungi had entered the wood through checks and shakes. Representative sections in the Norfolk-Washington line showed that after 17 years' service, of the 1,614 poles inspected, 1,469 were sound, 92 decayed at the top, and 105 decayed at the ground line. The decay at the top was caused chiefly by cutting off the poles. In those decayed at the ground line, the causes of failure, as determined in 88 per cent of the cases, were checks or shakes. Here again as in the ties, the preservative outlasted the mechanical life of the wood.

Unless some other factor than protection from decay is considered important, therefore, there is apparently no need to specify high boiling oils. The important point is that any coal tar creosote which is not extremely low boiling or extremely high boiling will satisfactorily prevent decay, and in the selection of an oil, factors such as price, penetrability, and convenience in handling should receive greater consideration than moderate differences in volatility.

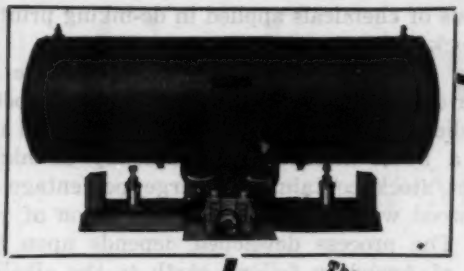
Meeting of American Chemical Society

The sixtieth meeting of the American Chemical Society was held at the Northwestern and Chicago Universities on September 6 to 10, inclusive, 1920. On Wednesday morning, September 8, at 9:00 o'clock, the cellulose symposium under the direction of G. J. Esselen, Jr., was held at Mandel Hall, Lecture Room, at the University of Chicago. A number of topics were discussed and among them was a report, which was prepared and read by Dr. Chas. Baskerville, Professor of Chemistry at the College of the City of New York, and Mr. Clarence M. Joyce, entitled "Regenerating Book-Stock." The report in part read as follows:

"To conserve the strength and length of fiber and secure the greatest yield, the old paper requires mechanical treatment whereby the fibers are loosened and drawn apart with minimum tearing; the chemical treatment should lift the ink, the substances used dissolving or emulsifying the binder and carrying the pigment particles away in the necessary washing. A combination of borax, soap, kerosene, and pine oil does this best; the last mentioned being a natural solvent of resin, used as size for many kinds of paper, and a solvent and emulsifying body for gums and resins, which are present in ground wood, used in cheaper grades of magazine papers. The process has been patented."

Dr. Baskerville and Mr. Reston Stevenson are also the authors of a paper entitled "Recovering Newsprint." "With the prices obtaining," they said, "the recovery of old newspapers in such condition as to

Coal saved paid for this Farnsworth System in four months



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Yours very truly,
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J. G. Mayo
President.

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be used again for newsprint, offer an opportunity for relative conservation, if not distinct economy in fact. Methods previously devised for recovering printed papers made little or no distinction between newsprint stock and book stock. The former normally contains a large proportion of ground wood, which yellows on treatment with caustic soda, the usual basis of chemicals applied in de-inking printed paper stock.

"The authors, recognizing the difference in character of the fibers in the several kinds of stocks, have studied the fundamental principles involved and devised a novel method for completely de-inking newsprint stock containing a large percentage of ground wood with the minimum production of yellowing. The process developed depends upon the addition of American fuller's earth to the alkaline solution in which the printed or soiled newspapers are pulped. The binder is loosened and the ink lifted from the fibers, the oils being absorbed by and the ink particles adhering to the argillaceous screen. Temperature factors and concentrations are given. A finished pulp, free from pigment and binder, clean as when first made, has been obtained ready made for the paper mill. If desired, the stock may be bleached by treatment with dilute sulphurous acid, but this is unnecessary for ordinary newsprint stock."

Professor Kahlenberg read a paper on "Cellulose Content of Various Compound Celluloses." The author presented results of experiments in which the cellulose content of various compound celluloses had been estimated by the ferric chloride hydrolysis method. Twelve different woods, nine straws, nine nutshells and two barks were investigated. Where comparable results have previously been published, the present results are of the same order of magnitude.

Wood and Cotton Cellulose Compared

"A Comparison of Wood Cellulose and Cotton Cellulose" was the subject covered by S. A. Mahood and D. E. Cable, respectively chemist and assistant engineer in Forest Products, Forest Products Laboratories, Madison, Wis. The report in part follows:

"Samples of wood cellulose and cotton cellulose, had been subjected to various conditions of cooking and bleaching, were analyzed by determining a number of constants on them, including ash, moisture alkali solubility, pentosan and methyl pentosan content, methyoxy content, ether extract, cellulose, lignin and 'copper number': for the purpose (1) of following the changes which take place in wood cellulose on successive cooking and bleaching treatment, with a view to increasing the yields of purified cellulose by varying these conditions, and (2) to determine so far as posible the points of similarity or difference of cellulose from wood and that from cotton.

"The data show that wood cellulose most nearly

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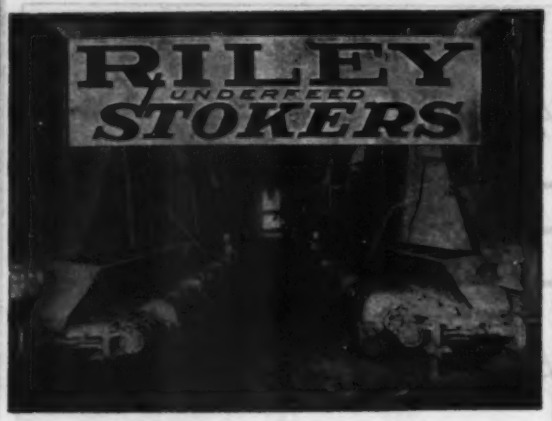

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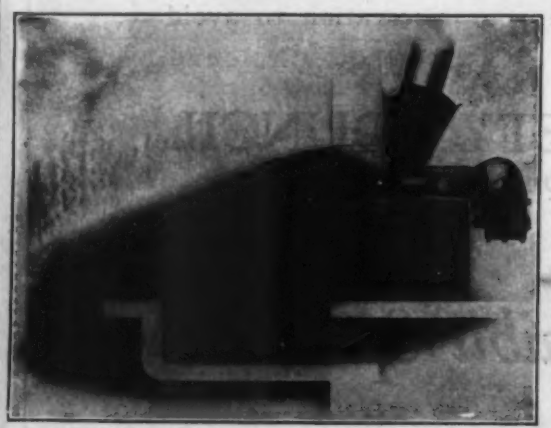

corresponding to cotton, taking munition linters as a standard, is obtained by recooking 'easy bleaching' sulphite pulp with soda and bleaching with two per cent of bleaching powder. This sample, however, represents the lowest yield on the basis of the original wood. Variations in cooking and bleaching treatments are suggested which may improve the yield of suitably purified wood cellulose.

"Alkaline cooking is shown to produce larger amounts of beta-cellulose than acid cooking. From a chemical standpoint, pulps produced by alkali are less similar to cotton than those produced by acid cooking or by acid and alkine cooking.

"It is apparent from the data that cellulose from wood and cellulose from cotton do not represent identical chemical aggregates, and the same is true of wood cellulose obtained by acid and by alkaline cooking. The practice of checking wood cellulose according to the specifications for cotton is therefore a questionable procedure."

Dr. Jessie E. Minor in a report pointed out that the recent work of Schwalbe and Becker confirms her theory that reactive insoluble, colloidal hydrocellulose is pure cellulose which has absorbed dextrines formed by the hydrolysis of some of the cellulose itself. These dextrines thus absorbed catalyze further hydrolysis as does also hemi-cellulose or acid treatment of the pulp prior to beating. Use is made of this phenomenon in making parchment paper. The absorbed dextrines assist in holding size, dye, coating, etc., but impregnation with metal weakens the strength of the resulting paper.

Power Plant Management

(*Continued from page* 838)

uniform fuel-bed, but, before making this adjustment to correct an uneven fire, be sure that it is due to the gates and not to other causes. Some settings provide definite arch ventilation, and the openings through the side and curtain walls must be kept clear, and indicate circulation.

If the ledge plate flanges provided in some settings have been disturbed by the setting of the brick wall, they should be set to within ⅛ in. of the stoker chain, to cut off air leaks between the chain and furnace wall.

For efficient operation, no unconsumed fuel should be carried over the end of the gate, and frequent gas analysis should be made. A few days' experimenting will determine the proper relation between fuel-bed thickness and speed of grate. See that all air openings are effectually closed.

If the fire tends to draw away from the grate, decrease the speed, increase the thickness of the fuel, or adjust the dampers. The thickness of the fuel-bed is shown on the gate indicator. Variation in gate height is necessary with coals varying in fineness and in volatile proportions. It is better to run a thick fire slowly than thin fires rapidly. The average speed should be about 3½ in. per minute. Keep the gate covered by

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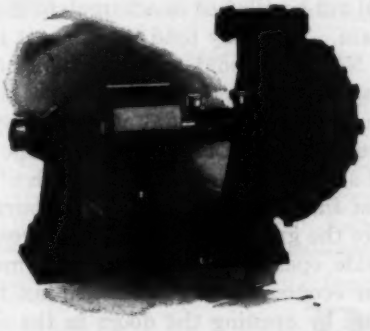

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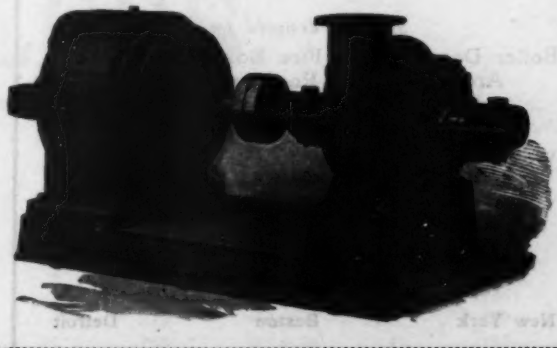

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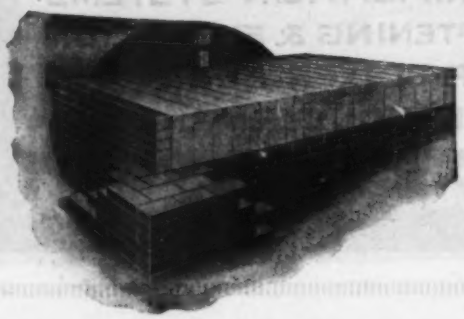

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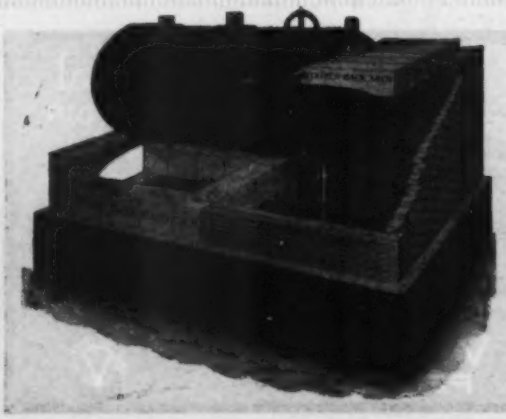

closing the dampers and slowing down the stoker with decreasing load, and vice versa with increasing load. Keep the bottom side of the feed gate tile in line, as an uneven fuel-bed makes an uneven fire. Insert new tiles when the old ones are burned down. Dampers should not be entirely closed during operation. A furnace draft of 1/10 in. should be the lowest draft permitted.

If the fire tends to pass over into the ash-pit, the fuel-bed feed is too fast or too thick, or the furnace is given insufficient draft. The fuel should be just consumed upon reaching the rear turning point. The back end of the grate should never become bare of live coals.

Adhesions usually form on the side walls. About once in 6 hours, run a bar under the hopper apron and gate, being careful not to dislodge tile. This should be repeated regularly, as often as necessary to keep the side wall clean and prevent the side links from being burned.

Ashes should not be allowed to accumulate in a pile around the chain. This may tend to overheat it and burn it out. Neither should the drippings of coal be allowed to accumulate. Put a little back into the hopper at a time, a large amount will act to make holes in the fire. It is not a bad plan to wet the drippings. Do not stop the stoker for any length of time with the hopper full of coal, as the fire will burn forward and injure the grate. Do not run the fires with the damper wide open, as high brick-work maintenance and poor economy will result. Do not try to regulate the fire by opening the doors in the stoker setting. In washing out the boiler, be careful not to wet the stoker arch, as nothing is more injurious. Keep the arch dry. With a coking coal, it is necessary to run a slice bar through the fuel-bed occasionally, to break it up and permit free passage of air.

If run at proper speed, so that no unconsumed fuel runs over the end, the links at the stoker front can be touched with safety. The speed should be such that all volatile matter will have been driven off the coal by the time it has traveled not more than half the length of the grate. Varying loads can be easily taken care of by proper regulation of the thickness of the fuel-bed and the speed of the grate. The damper will have to be regulated accordingly. If smoke is noticeable in the feed hopper, allow it to empty and inspect the gate shoes to determine whether they are being burned. If so, allow the hopper to remain empty until the shoes cool off.

To force the fire, open the boiler damper wide, speed up the grate, lower the feed gate, and loosen up the coal. A ¾ in. bar with a 6 in. bend at the end can be used. Run it through the furnace with the 6 in. flat on the grate. When at the rear, turn the bar completely over and pull it out. Continue until the whole grate has been gone over. Never disturb the top surface of the fuel-bed.

To bank the fire, let the hopper empty, stop the

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13	600	Edge Moor	200
20	600	Edge Moor	160
1	813	Edge Moor (A. S. M. E.)	200
Above located in du Pont Chemical Company's Plant at Hopewell, Virginia			
2	295	B. & W. (Stirling) located Carney's Point, N. J.	200
5	253	Stirling Class E No. 22	160
2	264	B. & W.	160
10	512	Stirling Class S No. 26	160
2	512	Stirling Class S No. 26	160
1	823	Stirling M-30 (A. S. M. E.)	200
2	550	Edge Moor	150
2	238	Edge Moor	150
1	231	Edge Moor (Ohio Standard)	150
1	199	Edge Moor	150
1	100	Smith HRT	100
1	50	Ames Locomotive	100
Above boilers located at du Pont Chemical Company's Plant, Carney's Point, N. J.			

MISCELLANEOUS

No.	Size, Hp.	Make	Pressure, Lb.
1	400	Stirling	150
2	400	Wickes	150
2	250	Wickes	165
2	250	Wickes	150
1	300	Wickes	150
1	225	Geary	150
1	250	B. & W.	125
2	210	B. & W.	125
1	125	Scotch Marine	125
1	78 x 20	H.R.T.	135
8	72 x 18	H R.T.	125
2	84 x 18	H.R.T.	100
2	66 x 16	H.R.T.	125
2	66 x 16	H.R.T.	80
1	500	B. & W. Steel header	180

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grate, partly close the damper, giving 1/10 in. draft in the furnace until the fire burns short. Close the damper almost to the smoking point. Loosely bank the coal against the lower edge of the gate, allowing a little air to get through. At intervals of 5 hours run the grate ahead a little.

To bring a banked fire up to rating, stir up the fuel-bed with a bar, partly open the damper, lower the gate to the operative point, fill the hopper, and as soon as the arch is thoroughly heated, start the stoker at a rate that will keep the fuel ignited at the gate. When the grate is completely covered, the damper may be opened and normal operation begin.

Selection and Testing of Rosin Size

(*Continued from page 850*)

which floats on the watery liquid in the funnel. After two or three hours, when the etherial layer has completely separated, the watery layer is drawn from the bottom of the funnel into a second funnel of somewhat larger capacity. The ether extract is washed twice with 25 c. c. portions of distilled water, the washings being added to the liquid in the second funnel. The washed ether extract is then run into a flask which has previously been dried and weighed. The funnel is rinsed with 25 c. c. of acid-free ether, which is run into the second funnel, where it is thoroughly shaken with the watery liquid. After the etherial layer has separated, the watery liquid is run off into a large beaker, and the ether layer washed twice with water as described above; the washings being added to the main solution in the beaker. The washed etherial layer is then added to the original etherial layer in the weighed flask. In cases of high free rosin sizes, it is necessary to make a third ether extraction of the solution in the beaker. This is carried out in the same way as the two extractions just described; the entire watery layer being retained for the combined rosin determination and the etherial layer being added to the two other layers in the flask. The ether in the flask is distilled off and the residue weighed, after drying for an hour at 100° C. The weight of rosin, thus obtained, multiplied by 100 and divided by the weight of original sample gives the percentage of free rosin in the size. Most prepared sizes run between 20 and 30 per cent free rosin.

Combined Rosin

In determining combined rosin, a few drops of methyl orange are added to the solution in the beaker mentioned above, and dilute sulfuric acid is added until a bright red color is produced. This treatment converts the combined rosin into free rosin. The analysis from this point is carried out in exactly the same manner as described for free rosin; with the single exception that it is not necessary to use acid-free ether. The weight of the dried residue, in this case, multiplied by 100 and divided by the original weight of sample gives the percentage of combined rosin.

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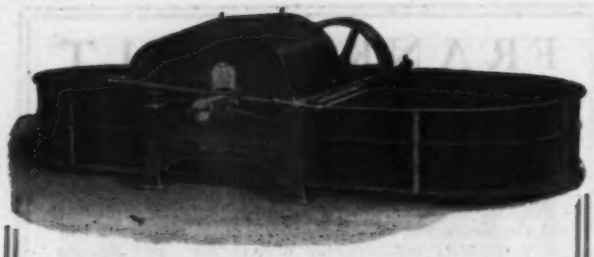

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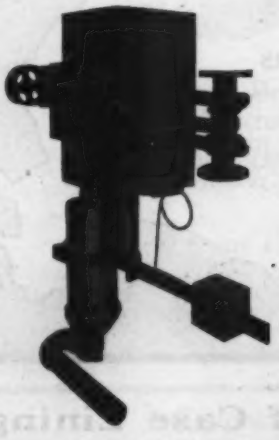

This is the

Trimbey Automatic Consistency Regulator

REGULATORS that REALLY REGULATE. which will cause stock to be delivered to beaters, mixers or paper machines at a uniform consistency. Something long sought in the paper industry.

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Ash and Total Alkali

In determining ash and total alkali, about 2 grams of the size are weighed into a platinum or nickel crucible, which has previously been dried and weighed. The mixture is heated very gently to drive off the water and burn the organic matter. When most of the carbon has been consumed, the heat is increased, and continued until the size has burned to a gray ash. The crucible is then cooled and weighed. The weight of ash, multiplied by 100, and divided by the weight of sample is the percentage of ash in the size.

In determining total alkali, the ash mentioned above, is extracted with hot distilled water to dissolve out the soda. The solution, after being cooled, is titrated with standard tenth normal acid, using methyl orange as an indicator. Directions for making this titration may be found under "Testing Soda Ash" in any standard work on quantitative analysis. The number of c. c. of standard solution used, multiplied by the normality factor times 5.30 and divided by the weight of size burned off gives the percentage of soda ash in the size. This figure should be only slightly below the figure for the percentage of ash.

Comments on Size Testing

The following comments may be made on the subject of size testing:

1. The testing of rosin size is a rather difficult matter, and should not be attempted by anyone not having the equivalent, at least, of a high school training in chemistry.
2. It is seldom necessary to make all the above described tests on any one batch of size. The moisture and total alkali, however, should be tested quite frequently.
3. There is no test on size which can compare with a careful observation of its action under mill conditions.
4. The best teachers on the subject of size are experience, close observation, experimentation, and MORE EXPERIENCE.

Conveyor Hazards

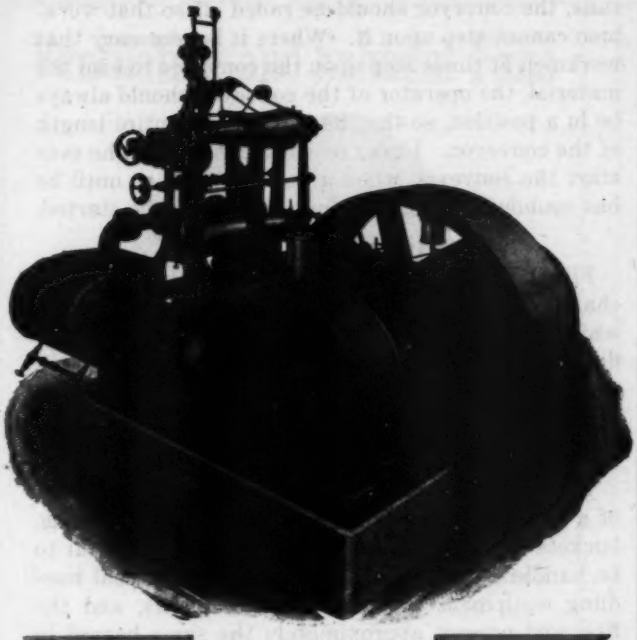
(*Continued from page 854*)

the extreme limit at which conveyor belts should be operated.

Chain Conveyors

Chain conveyors are made in various types and to serve various purposes. Frequently, hooks are attached to the chain links and from these hooks the material is suspended. In another type, the chain passes through the bottom of a trough and has attached to it at intervals lugs which serve to pull the material along in the trough. The return portion of chain or cables should be effectively guarded against contact.

Where the conveyors are in continual operation, as is ordinarily the case with log haul-ups from water-



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The engine illustrated above is especially designed to drive paper machines, giving continuous and reliable service. A patented safety device protects your employees and plant.

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We can make them better than new—prompt delivery guaranteed—uniform quality at a satisfactory cost

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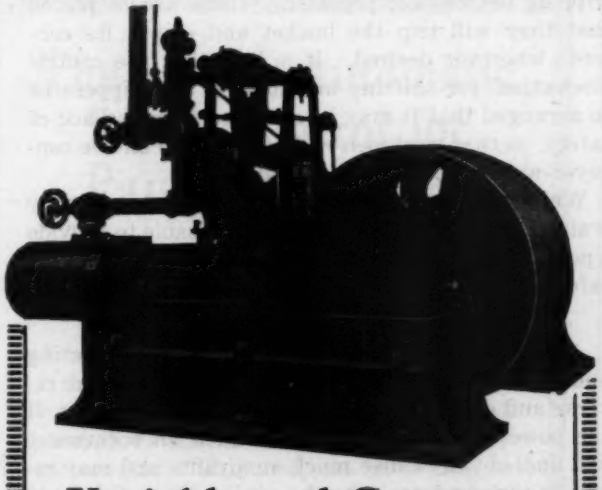
Inquirers Please Mention THE PAPER INDUSTRY



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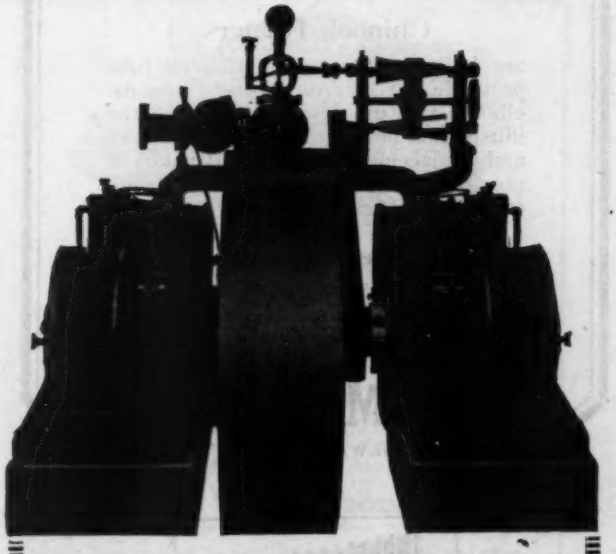

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runs, the conveyor should be railed off so that workmen cannot step upon it. Where it is necessary that workmen at times step upon the conveyor to load the material, the operator of the conveyor should always be in a position, so that he can see the entire length of the conveyor. Under no conditions should he ever start the conveyor when a man is on it, or until he has sounded a gong warning that it is to be started.

Flight Conveyors

Flight conveyors are in fact an adaptation of the chain conveyor, consisting essentially of a chain to which at regular intervals are attached scrapers, or flights which are pulled through the conveyor trough (usually of metal). The hazards in their use are the same as with ordinary chain conveying equipment.

Bucket Conveyors and Elevators

The bucket conveyor or elevator consists essentially of a chain to which is attached at regular intervals, buckets for hoisting and conveying the material to be handled. They are commonly used for coal handling equipment in stone-crushing plants, and the like, and present approximately the same hazard in their use as the belt and flight conveyors.

Where bucket elevators are enclosed, it is customary to provide removable sections (doors) in the enclosure for inspection purposes. No attempt should ever be made to remove material from the buckets at these inspection doors while the elevator is running.

For emptying the buckets at any desired location, tripping devices are provided. These are so placed that they will trip the bucket and empty its contents wherever desired. It is best that the control mechanism for shifting and locking the trippers be so arranged that it may be operated from a place of safety, so that workmen will not need go on the conveyor-way to change position of tripper.

Where the conveyors hoist the material and carry it along over stokers or bins, it is advisable to provide a permanent foot-walk alongside the conveyor for the safety and convenience of repairmen and operators.

Safety Stop

A bucket elevator or an inclined conveyor operating under a load will, unless a safety stop is provided, reverse and carry the material to the loading point, if the power is suddenly cut off. Such an occurrence will undoubtedly cause much annoyance and may result in serious damage to the equipment or injury to persons. Every bucket elevator or conveyor should be provided with a mechanical device which will prevent the machinery running backward.

Apron Conveyors

Apron conveyors or slat conveyors consist essentially of two strands of link belt or chains to which plantes or strips are attached so as to form a continuous surface. The apron, or slat conveyor or carrier, is particularly suited for handling abrasive materials such as heavy boxes and cases, freight packages, etc.

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furnish efficient ventilation at a minimum of power required, a low first investment and at a greatly reduced space requirement. They are accurately balanced, easy running and practically noiseless in operation.

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are built on the tube within a tube principle, free from return bends, elbows and nipples as shown by the illustration below. This makes repairs and replacements easy, and makes it possible to ship them K. D. thus saving freight and breakage.

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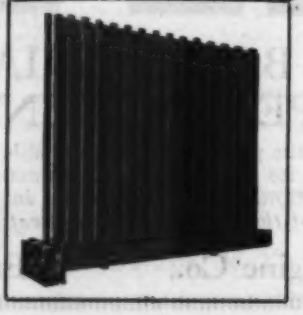

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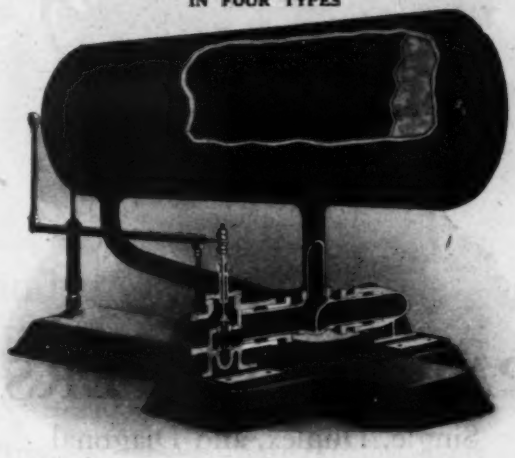
IN FOUR TYPES



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The best trap made to remove the steam condensation from paper machine dryers. Works on a new and improved principle different from any other trap on the market.

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WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

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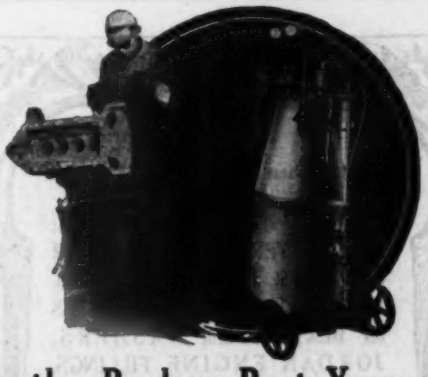

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Fix the broken part yourself in a few minutes and save time and the cost of a new casting. Simple to operate, the Imperial possesses the added advantage of independence and economy of operation. It makes its own acetylene as needed 2 to 4 cents cheaper per cubic foot than you can buy it.

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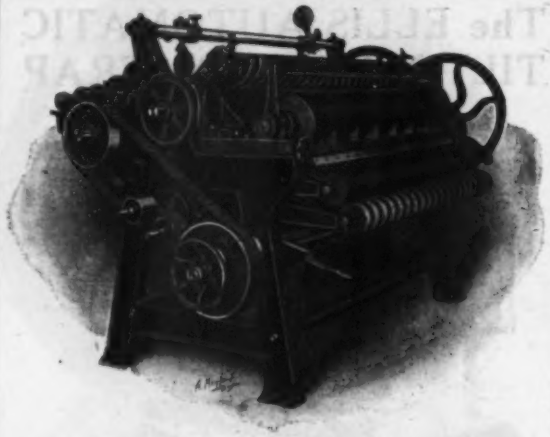

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Single, Duplex, and Diagonal

CUTTER KNIVES
PATENT TOP SLITTERS

Hamblet Machine Co.
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Intensive specialists in the manufacture of uniformly high grade machine knives for the pulp, paper and board industry

Portable Conveyors

Belt, flight, and apron conveyors are sometimes made in portable motor-driven units mounted on wheels or suspended from trolley track and moved from one location to another in a plant. The hazards in their use are the same as with the stationary type. The feed circuit should be armored cable, and all live electrical parts should be properly enclosed.

Screw Conveyors

The principal danger in the operation of spiral screw conveyors is that of the workmen getting their hands or feet caught in the conveyor. Never, under any condition, should an attempt be made to loosen material in a screw conveyor trough without first shutting off the power, nor should any attempt be made to repair conveyor troughs while the conveyor is in operation. It is suggested that a warning sign "SHUT OFF POWER BEFORE LOOSENING MATERIAL," be placed over opening in conveyor troughs.

All conveyor troughs should be completely covered over. The covers are ordinarily made in removable sections for purpose of inspection and convenience in dislodging choked material. One member of the National Safety Council has taken the precaution to provide double covers for their conveyor troughs. A second cover, made of heavy wire mesh, is placed underneath the solid top. This wire mesh cover is made in removable sections corresponding in size to the top cover sections. The screen covering underneath will permit of inspection and still guard the screw. It may be removed when necesary.

Frequently the charging doors to screw conveyor troughs are not properly guarded, and a workman may carelessly step into them and be injured. In every case the charging stations should be grated over with a substantial grating, or else properly boxed in to a sufficient height so that workmen cannot step into them.

The driving gears at the end of conveyor troughs should be entirely enclosed.

Aerial Cableways

Aerial cableways are frequently used to some extent for coal handling equipment. The principal hazards in their use are falling material, injury to workmen inspecting and oiling the cables and carriage, and misunderstanding of signals.

No attempt should be made to carry on work directly underneath the tramway, except, of course, at the loading and unloading stations where exceptional precautions should be taken. Wherever it is necessary for workmen frequently to pass underneath the tramway, it is suggested that a covered passageway be provided.

It is of much importance that a dependable and sure method of signalling be had wherever men must work at the loading or unloading stations. A telephone or electric push-button system is advisable.

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One hundred per cent pure anhydrous for use **with any control apparatus.**

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Prompt shipments made due to our large capacity.

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Strongest, quickest settling, most stable Bleaching Powder manufactured.

Shipped in 225 lb., 450 lb., 750 lb. drums for domestic trade. **Special wooden lined drums for export holding 400 lbs.**

If you have a problem to solve write us, and we will give same the closest and Promptest attention of our Technical Service Staff.

Swenson Evaporators In the Plant of the St. Maurice Paper Co., Ltd.

The plant of the St. Maurice Paper Co., Ltd., at Cape Madeline, Canada, is Swenson equipped.

A Swenson Quadruple Effect Evaporator has been in operation here since May, 1917. It is used for concentrating "Black Liquor" in sulphate pulp process, and results, according to the plant superintendent have always been exceptionally good.

For increased output—lowered production costs—larger profits, it pays to specify Swensons.

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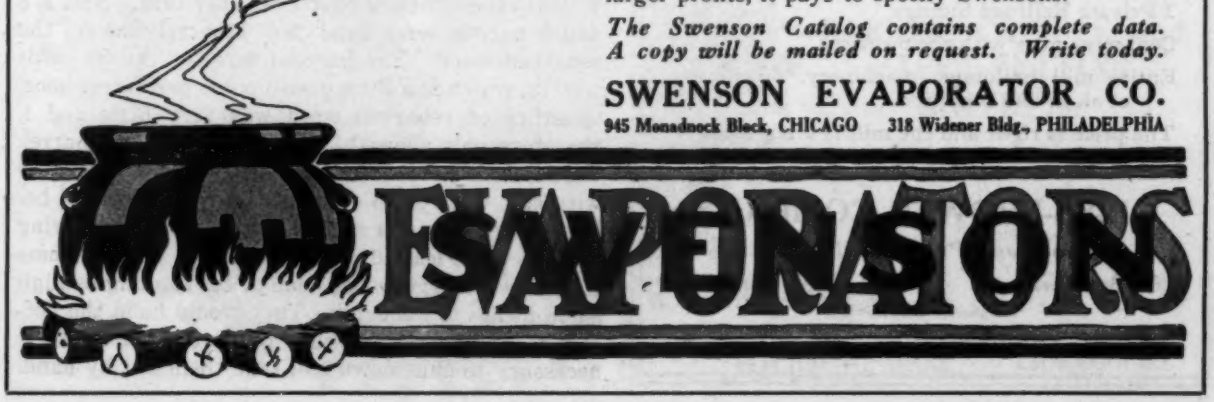

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

Send for full particulars

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FOR SALE

50 Ton Board Mill in Excellent Location

2—5 cylinder Paper Machines 55 dryers each—62" trim.

5 Beaters and 4 Jordans.

3 Private Railroad Sidings.

Coal mine goes with the property.

Entire mill buildings, machinery, dwellings, et al. in fine condition.

The price is right and the mill is a big money-maker.

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Paper and Pulp Mill Brokers
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Telephone: Barclay 8870
OUR MOTTO: "Service First"

Hardwood for Paper

(*Continued from page* 851)

investigators that attention should be paid by the print paper manufacturer to the possibilities of yellow birch, as a means of eventually cutting the high price of paper. The New York State College of Forestry at Syracuse has the most complete pulp and paper experimental laboratory of any educational institution in America, and its studies are to be continued. Meanwhile a study of the insects which attack yellow birch is being made at the forest insectary of the College at Wanakena, N. Y., in the Western Adirondacks, the only insectary in the country maintained in the forest under natural conditions, in an effort to learn the habits of wood destroying insects that the yellow birch may be protected and grown to merchantable size without insect injury.

The study was even extended to the making of a microscopic study of the fibre structure of the birch. This study will be made by Dr. H. P. Brown, head of the Department of Dendrology, one of the best authorities in queries on microscopic structure of woods.

A unique work in study of insects is being made by Prof. Carl J. Drake, Forest Entomologist of the College of Forestry, and he has already found twice as many species in yellow birch as have previously been listed. Their life history will give the scientist the information on how to work out methods of control. The first publication on this study will be on insects affecting the reproduction of the tree.

In view of the work that is being done along these lines, it is interesting to note that a report from Canada tells of experiments actually done by the Laurentide Company at Grand Mere, Quebec. Because of the interest in the college in birch growth, Ellwood Wilson, Manager of the Forestry Division of this great Canadian Company secured permission for the college to use the following reports of actual mill experiments with hardwood. The reports are as follows:

"After our unsuccessful attempt to bark hardwood on the disc barkers on May 12th, a conveyor was placed and the hardwood was delivered to the conveyor to the tumbling barrels on May 15th. Nos. 1, 2 and 3 barrels were run. No. 1 barrel was on the rebarked wood. The barrel hours for the 59 cords was 19, which is a little over 3 cords per barrel hour. Quantity of rebarked wood was very little and I, therefore, only allowed 1 barrel hour for No. 1 barrel. Three cords per barrel hour is very low compared with soft wood of 15 cords per barrel hour, but I believe under proper running conditions we can bring that up to at least 6 cords per hour. We had some trouble with large wood, some pieces running as high as 18 inches in diameter. They would lie in the bottom of the barrel and just roll around, making it necessary to shut down and take them out by hand.

The BLACK-CLAWSON Co.

HAMILTON, OHIO

Builders—**Paper and Pulp Mill Machinery**—*for*

INCREASED PRODUCTION **SERVICE ALWAYS**

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BARKER, CHIPPER and PAPER CUTTING KNIVES for

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THE DAVIS STEAM TRAP is one of many Davis Steam Savers that have found profitable application in Paper Mills. Note the large float, the sensitive leverage, the balanced, renewable valves, and valves and seats of Tobin bronze, the by-pass, and the working parts all attached to the cover and removable with it. Write to the G. M Davis Regulator Co., 414 Milwaukee Ave., Chicago, for a complete catalog.
DAVIS VALVE SPECIALTIES
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Do You Have Many Ashes to Handle?
Every pulp and paper mill of any size has ash handling problems. Over fifty mills have solved their problems satisfactorily—they are now using
AMERICAN
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The jet of high velocity steam carries the ashes away instantly. The conveyor cuts handling from hours to minutes. Saves 50 to 75%. Send for catalogue P, that describes this conveyor.
AMERICAN STEAM CONVEYOR CORPORATION
Coal and Ash Handling Equipment
326 W. Madison Street
CHICAGO
110 W. 40th St.
NEW YORK

Our conveyors are, also, of too light a construction for these large pieces. With our present equipment I do not believe it would be advisable to run any hardwood over 12 inches in diameter and never allow over one-half as many pieces of hardwood in a barrel as we do of softwood.

Conclusions of Operating Department

"We feel that we will be able to use successfully 4-ft. lengths of hardwood if it is possible to deliver it to the mill yard so that it may be put through the drum barkers after the main drive is passed. It would be advisable to use not less than 25 to 30 cords per day, probably not over double this quantity.

"In order to determine the practicability of grinding hardwood, the Forestry Division got out about 65 cords of hardwood with which to run the test. This wood was stored in the yard for several months and finally on August 17, 1918 we started to grind on No. 7-A stone: the stone was practically new and we used a six-cut straight tooth burr for sharpening. The test covered little over two days and the results, both from a quantity and quality standpoint, were very gratifying. The average production was 77,000 lbs. per stone per 24 hours dry weight and the quality was good; viz., the fibres were very fine but quite uniform, and I think for summer conditions 10 per cent or 15 per cent of this pulp would be beneficial to our stock as a whole. The pulp produced was of slightly darker color than the ordinary run, and of course, was run much thinner in the pits in order to prevent burning. The wood as weighed into the mill averaged 5,483 lbs. to the cord and was 76.42 per cent dry.

Automatic Cooking Control

(*Continued from page* 855)

Once the cook is started, it needs no further attention until blowing time, and further, when a cook is started it is known beforehand when it is going to blow, within a few minutes. The reason for this is that it takes a certain and very definite quantity of steam to cook a cord of chips. Steam is metered into the digester at a predetermined rate and therefore it is known beforehand when the digester will blow. The cooking time may be shortened by steaming at predetermined higher rates and lengthened by steaming at predetermined lower rates. It has been proven that other conditions such as will occur from day to day do not affect the cooking time only to an almost negligible degree. When the digesters of any one mill are steamed automatically, the proper spacing out of the blowing time follows as a natural and inevitable result. If as sometimes happens after blowing a digester a small amount of repairs are found necessary to the blow valve or piping which delays the time of starting to cook the next charge of chips, the cooking operation can nevertheless be finished on schedule time by adjusting the control apparatus to maintain a higher steaming rate.

The automatic relief valve can be set to maintain

Paper Mill Lubrication Raised to the Highest Degree of Efficiency

In order to "make good" day after day in paper manufacturing a lubricant must be able to "stand up" under excessive bearing pressure and resist the heat transmitted by steam as well.

Extensive use of Keystone Grease in large paper mills throughout the country conclusively proves it to be unparalleled for the lubrication of both calender and finishing rolls of any character, particularly where unusual heat conditions exist.

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New York, Boston, Pittsburgh, Chicago, St. Louis, Denver, San Francisco, Minneapolis, Houston

The CHICAGO Approved Portable WATCHMAN'S CLOCK

with its special Waltham movement, its lock stations and its superior quality throughout, is especially desirable for mills and factories and for either in-door or out-door patrol.

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CHICAGO WATCHMAN'S CLOCK WORKS
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Seamless Welded DIGESTERS *and* TANKS

FOR PAPER AND PULP MILLS

We make them of any thickness, diameter or length for paper and pulp mill uses.

WITH your mill running 24 hours per day and still unable to meet all the demands of your customers, a leak in your digesters or tanks means a big loss to you. You will avoid all this trouble if you install Kellogg's Seamless Digesters and Tanks, welded by the Forge and Hammer Process, the strongest weld of any process in existence.

Testing Seamless Hammer Forged Welded Sulphate Digester for Brown Corporation, La Tuque Mill, Quebec.

To the man that is willing to be "shown," just ask us to prove their economy and efficiency. A letter will start the ball-a-rolling.

THE M. W. KELLOGG CO. **140 Cedar Street, New York**

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Large Arch and Square Blocks a Specialty
All Shapes and Sizes

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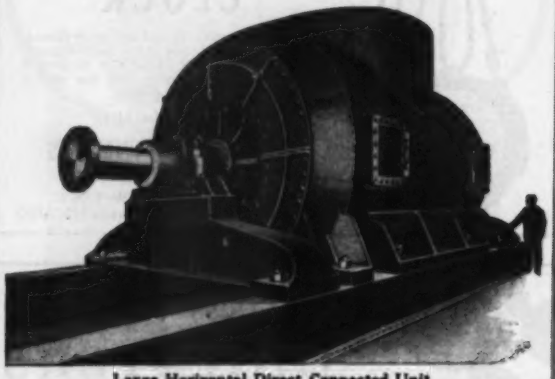
High Speed — High Horsepower — High Efficiency

Vertical and Horizontal Designs



Large Horizontal Direct Connected Unit

Write for Bulletin 54

***The* JAMES LEFFEL & CO.**

SPRINGFIELD, OHIO

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SMITH HYDRAULIC TURBINES

Accompanying view shows one of eight horizontal shaft "SMITH" Turbine units in successful operation in the Cornell Wood Products Co. mill at Cornell, Wis. Each unit develops 1550 H.P. under 37' 6" head.

FOR STABILITY AND EFFICIENCY SMITH TURBINES ARE UNEXCELLED

If interested, write for Bulletin "S"

S. MORGAN SMITH CO., York, Pa.

BRANCH OFFICES:

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any pressure it is desired to carry within the digester. The relief valve stem is operated by a diaphragm which carries digester pressure on one side and is counteracted by a spring on the other. The diaphragm and spring are made large so that the resistance due to the sticking of the valve stem in its packing is practically negligible in comparison with the forces which tend to actuate the valve. When cooking by hand, a good cook tries to open his relief valve by very small amounts at each adjustment and just enough to hold the digester pressure against his steam valve opening. If he happens to open too wide, the strainer plugs. It is then necessary to shut off steam, blow back the strainers and start over again. The automatic valve cracks open by exceedingly small increments. It is always open the correct amount and instantly responds to changes in pressure too small for a cook to detect even if he happened to be trying to do so.

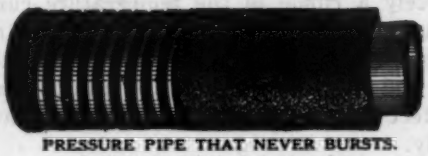
The strainers used in connection with the control apparatus are of two different designs; one is adapted for use under the cover and the other in the digester neck. The cover strainer, so-called, is somewhat similar in appearance to other strainers in general use. It consists of a bronze internal frame work an an outside covering of thin perforated lead. The neck strainer, so-called, is made of perforated hard drawn lead. It is cylindrical in form and wide open at both ends. The outside diameter of this strainer is approximately 1½ in. less than the internal diameter of the digester neck. In short, this strainer is a perforated lead bushing fitting loosely in the digester neck. In operation, the relief gas and liquor flow from within the strainer outwardly to the space between the bronze sleeve in the digester neck and the strainer, from thence through the digester neck and through a pipe of suitable size to the automatic relief valve. This is a stationary strainer; i. e., it is not removed when the digester is being refilled.

In the cooking of sulphite, many mill superintendents seek to have their cooks follow predetermined temperature curves. This practice represents an effort in the right direction and results in a somewhat greater uniformity of quality than is the case where steaming is left entirely in the hands of the attendant. Temperature recorders give only a very rough indication of the steaming rate. It is easily possible to produce a very smooth temperature curve and a very erratic steam flow curve at the same time.

Temperature recorders are sluggish and slow to respond to the throttle valve. They do not indicate the rate of steam input at any instant. Changes in the quantity of steam pouring into the digester can be detected by means of the temperature recorder only after the lapse of considerable time.

Moreover, the temperature at any two points within the digester are seldom the same. This fact is illustrated by the three sets of temperature records shown in Fig. 1. These are records of actual cooks.

WYCKOFF WOOD PIPE



PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 48 inches.

The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

The Pipe of Service

DURABLE—ECONOMICAL—EASY TO INSTALL

Built of selected Canadian White Pine, Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 58,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

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EASTWOOD Wire Mfg. Co.

Fourdrinier Wires
Cylinder and Washer Wires

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Manufacturers of

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Cylinder Covers and Other Paper Machine Wire Cloth

All Well Made at

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A TEST

MEASURES EVERY PHYSICAL QUALITY IN MATERIAL

Paper, Felt, Rubber, Etc.

Write for our booklet—just out—and the story of the development of this universal testing device.

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Remember

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Originators and Oldest Manufacturers
OF THE

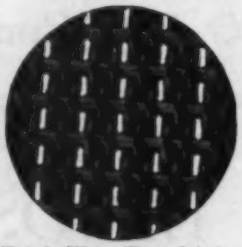
Cast Bronze Screen Plate

ALSO SPECIALIZE IN

Acid Resisting Digester Parts

TYLER

Triple Warp Fourdrinier Wire



Triple Warp Fourdrinier Wire, Magnified Section

TYLER

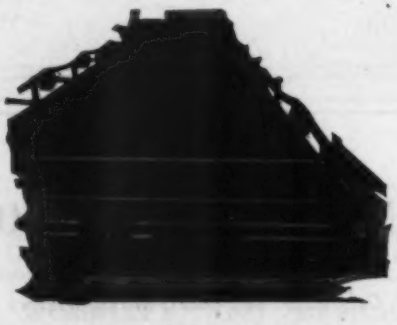
Triple Warp Fourdrinier Wires

The Tyler Triple Warp Fourdrinier Wires are made from phosphor bronze wire and are used for making finer grades of light weight paper, such as carbon, cigarette, high grade tissue, India and Bible papers, and other specialties.

As illustrated above, these wires are woven with a triple warp and a single shoot wire.

The triple warp wires can be woven to fit any paper-making machine, but are generally used on the smaller machines.

Prompt deliveries can be made on all meshes of Tyler Fourdrinier, Cylinder and Washer Wires. In many instances shipment can be made from stock, including the Tyler Special Wires and the regular No. 60, 65, 70, 75 and 80 Wires.



The W. S. Tyler Company

Cleveland, Ohio

Manufacturers of Fourdrinier Wires, Cylinder Faces, Washer Wires, Corduroy Cloth, Backing Wires

The dotted line in each case is the temperature in the side of the digester, the solid line is the temperature in the head.

Violent changes in the steam rate of short duration cause scarcely a ripple in the temperature curve; however, spasmodic and violent changes in the rate of steaming do cause non-uniformity of product. Spasmodic and violent changes in the rate of steaming also affect the economy of steam plant operation disastrously.

A sulphite cook whose experience in cooking sulphite dates back over a period of seventeen years once said to me, "I never steam two digesters alike, and no two cooks steam digesters alike." This man spoke the truth as the evidence in Fig. 2 on page 855 indicates.

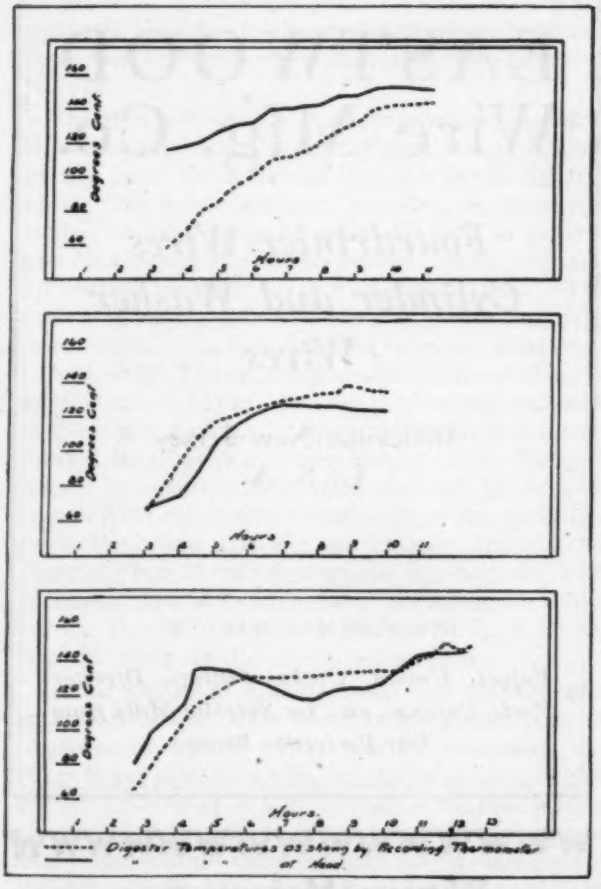


Figure 1

The first three curves are the steam flow meter records of three cooks steamed by hand. The next three curves are the actual steam flow meter records of three cooks steamed with a well-known regulator; these are even worse than the records from hand control, though, to be fair, it should be said that this regulator produces a very smooth pressure curve. However, the degree of smoothness of the pressure curve is no indication of quality, or the cooking time.

The last three curves are actual steam flow records

Silicate of Soda

WE ARE MANUFACTURERS OF

SPECIAL GRADES FOR LINING DIGESTERS
SPECIAL GRADES FOR USE IN THE BEATER AS A FILLER AND FINISHER
SPECIAL GRADES *for* ADHESIVE PURPOSES
SHIPMENTS IN TANK CARS OR DRUMS

MANUFACTURERS OF

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SULPHURIC ACID
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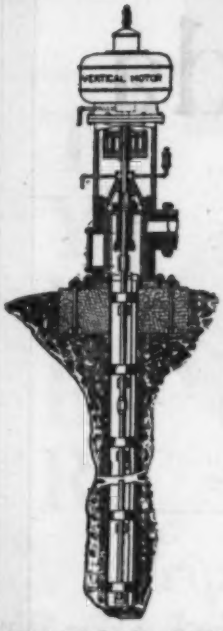
SODIUM SULPHIDE—*All varieties*

The Grasselli Chemical Co.

CLEVELAND
CHICAGO CINCINNATI NEW YORK BIRMINGHAM
MILWAUKEE ST. LOUIS NEW ORLEANS
ST. PAUL DETROIT PITTSBURGH

Gregg Propellor Pump



This pump is especially well adapted for paper mill use where tubular wells are used for water supply.

WHY

This pump has great capacity and will deliver more water from tubular wells than any known pumping system.

When suction pumps and air lift systems fail to secure the water, try a GREGG Propellor Pump.

Many of the largest Industrial Plants, Packing Houses, Paper Mills and Railway Companies have adopted the GREGG Propellor Pump for their use.

THERE IS A REASON

Write for particulars

GREGG PUMP COMPANY

KANSAS CITY, MO.

The YARYAN EVAPORATOR

As engineer for the Yaryan Co. I installed, in 1886, the first Yaryan Evaporator placed in a soda pulp mill for the recovery of soda.

The Yaryan Evaporator is familiar to all soda pulp manufacturers.

Many important improvements have recently been made, but the principle has been retained.

It is the ideal evaporator for Soda and Sulphate Mills

CHARLES ORDWAY

25 Church Street New York City

SUCCESSOR TO
THE YARYAN COMPANY

taken from the same digester when steamed automatically. The first two curves were produced with the apparatus set for a 10½ hour cook, the last curve with the apparatus set for an 8¼ cook. The quality of sulphite produced by these automatically maintained steaming rates was excellent.

In general, it may be stated that the form of the steam determines quality, and that the average rate of steaming determines the length of the cook.

The Federal Water-Power Commission

The recently enacted Water Power Bill which so directly concerns the paper industry in this country has provided a Federal Water-Power Commission, which consists of Newton D. Baker, John Barton Payne and Edwin T. Meredith, respectively Secretaries of War, Interior and Agriculture.

The Commission will issue fifty-year licenses for power projects and transmission lines and will pass upon the scheme of development of power sites, plans and specifications of the works, upon certain features of maintenance and operation and will have jurisdiction over the regulation of rates and service whenever the state has no agency to look after such regulation.

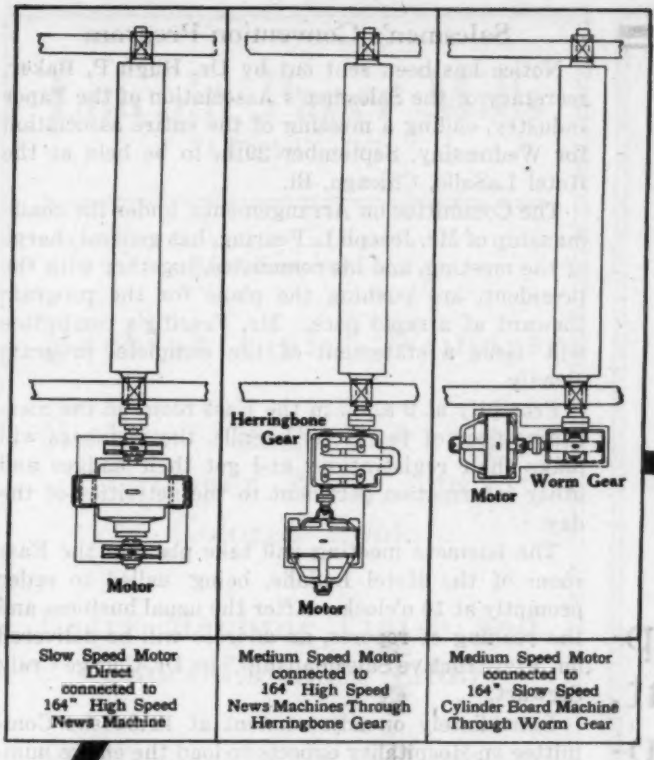
The work will include thorough investigation and collection of data pertaining to the utilization of the water resources of any region where plans for development are contemplated. The Commission will also investigate and compile a report on the water-power industry as a whole and its relation to other industries and to interstate and foreign commerce.

The bill provides for an investigation and report on the Great Falls power project on the Potomac above Washington, and reports on all projects on navigable streams in which it appears that construction of suitable structures for unimpeded navigation cannot be undertaken by the applicants for license.

The responsibility for much of the detailed administration of the Water Power Bill will rest with Oscar C. Merrill, formerly chief engineer of the Forest Service, who has been appointed Executive Secretary to the Commission, and the engineering surveys will be placed in the hands of Lieut. Col. William Kelly, who was appointed by President Wilson as engineer officer of the Commission.

It is difficult to estimate the vast benefits of the proper development of our sixty million available horsepower. Only by proper development of these resources can the industrial life of the country reach its maximum. Each year the fuel situation is becoming more acute owing to strikes, transportation difficulties, speculation, etc., but with development of our water-power resources a vast amount of coal will be conserved or rendered available for other work.

Cleanliness and order, and a place for everything, are essentials of Safety," says the National Safety Council.



Slow Speed Motor Direct connected to 164" High Speed News Machine	Medium Speed Motor connected to 164" High Speed News Machines Through Herringbone Gear	Medium Speed Motor connected to 164" Slow Speed Cylinder Board Machine Through Worm Gear

Do You Know—

that Westinghouse Sectional Individual Motor Drive is suitable for any Paper Machine Installation

THESE VIEWS SHOW ACTUAL FLOOR SPACE REQUIRED

Space available for a paper machine drive often determines the mechanical arrangement of the drive.

With Westinghouse system of sectional individual motor drive there are three typical ways of applying the motors to the paper machine sections:

DIRECT CONNECTED DRIVE—for high speed news and medium speed book and specialty machines, because the speeds of the section shafts of the paper machines are sufficiently high to make direct connected motors practical and economical.

HERRINGBONE GEAR DRIVE—for paper machines of any kind where such type of drive suits the specific conditions better than direct connected or worm gear drive.

WORM GEAR DRIVE—particularly for slow speed cylinder machines, on account of the large speed reductions, but also applicable to medium and high speed Fourdrinier machines.

The ultimate results, namely, increased production, lower maintenance and improved mill conditions, are obtained by the use of that one of these arrangements which best meets specific requirements.

Our representative will be pleased to go over this further with you. Write our nearest district office.

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MOSINEE, WISCONSIN
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Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

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presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

Mosinee Kraft

"The Wrapper that Delivers the Goods"

Salesmen's Convention Program

Notice has been sent out by Dr. Hugh P. Baker, secretary of the Salesmen's Association of the Paper Industry, calling a meeting of the entire association for Wednesday, September 29th, to be held at the Hotel LaSalle, Chicago, Ill.

The Committee on Arrangements, under the chairmanship of Mr. Joseph L. Fearing, has general charge of the meeting, and his committee, together with the president, are pushing the plans for the program forward at a rapid pace. Mr. Fearing's committee will issue a statement of the complete program shortly.

Promptly at 9 a. m. in the East room on the mezzanine floor of the Hotel LaSalle, the members will make their registrations and get their badges and other information pertinent to the activities of the day.

The business meeting will take place in the East room of the Hotel LaSalle, being called to order promptly at 10 o'clock. After the usual business and the reading of reports, an address will be delivered on "Constructive Salesmanship," by Dr. George Craig Stewart.

Immediately on adjournment at 12:30 the Committee on Hospitality expects to load the entire number of delegates into automobiles and take them to an outlying hotel for luncheon.

The afternoon session, which will be educational, will be called to order at 2 o'clock. Such subjects as the financial situation, labor situation, transportation, fuel and power, and raw materials will be discussed.

On adjournment at 4:30, the Hospitality Committee will take the delegates through the city and back to the LaSalle Hotel for the banquet in the evening, which will begin promptly at 6 o'clock. Among the speakers of the evening will be William C. Free, president of the Free Sewing Machine Company, of Rockford, Ill. He will speak on "The Psychology of Salesmanship," and Judge Charles S. Cutting, of Chicago, who will speak on the subject of "Law and Order as a Prerequisite to Business Stability."

Adjournment at 8 o'clock promptly.

The Committee on Registrations, Chairman, Mr. J. Ray Russell, whose address is 111 West Washington street, Chicago, has reserved one hundred rooms at the LaSalle Hotel for the out-of-town members. All members are asked to notify him when they will be here and what rooms they wish.

President, Mr. Gibson, stresses punctuality, asking all the members to be in their places promptly for the opening of all sessions. A large attendance of the members of the association from all parts of the country is expected.

The Salesmen's Association is the youngest association in the American Pulp and Paper Association, but it is alive and making rapid progress. The mem-

Lincoln Paper Mills
ELKHART, IND.

Manufacturers of

Machine Finish Writings

Machine Finish and Super Calender White and Colored Book

Extra Machine Finish and Super Calender Litho

Mimeograph and Specialties

Eastern Manufacturing Company

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501 Fifth Avenue, New York

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Makers of Fine Writing Papers

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WHY sit mournfully under a weeping willow tree and weep about the shortage of pulp wood when Luther Burbank can grow a black walnut tree two and one-half feet in diameter in sixteen years?
Kalamazoo Vegetable Parchment Company
Kalamazoo, Michigan
"World's Model Paper Mill"
Manufacturers of waxed and vegetable parchment paper.
PULP FAMINE FEARS

HAMMERMILL BOND
HAMMERMILL SAFETY
HAMMERMILL LEDGER
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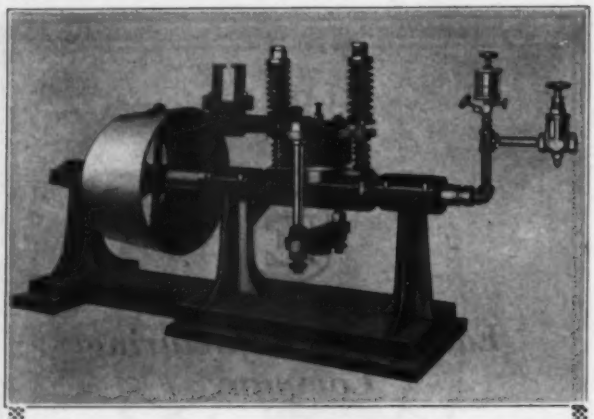
The Standard Utility Business Papers and the Most Widely Used Papers in the World

MADE BY
HAMMERMILL PAPER CO., Erie, Pa.
NEW YORK OFFICE: 291 BROADWAY



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By installing a

Nash Air Shake

on your

Fourdrinier Machine

These are the possibilities, all of which mean a better sheet and a larger profit:

1. As near a continuous motion as can be made.
2. Soft and uniform throw.
3. Will not buckle the tube rolls from the jar.
4. It will carry a larger percent of filler by a more dense sheet.
5. A smoother and more uniform sheet of paper obtained.
6. Can be adjusted while in motion to suit the condition of the stock without any waste of paper.
7. It is easy on the machinery and neat in appearance and is worth investigating.

For further information, write

WILLIAM C. NASH

NEENAH, WIS.

bership has increased since the first New York meeting in April fully fifty per cent, and new members are coming in every week.

A full account of the proceedings of the convention will be found in this paper in its next issue.

Cost Association Program

The Cost Association of the Paper Industry will hold a convention at the Waldorf-Astoria Hotel, New York City, on Monday and Tuesday, September 27 and 28, 1920. During the convention, cost systems of the American Writing Paper Co., Holyoke, Mass.; Chemical Paper Manufacturing Co., Holyoke, Mass.; Eastern Manufacturing Co., Bangor, Maine, and Strathmore Paper Co., Mittineague, Mass., will be on exhibition. The program is as follows:

Monday, September 27th

Registration—Astor Gallery.

Addresses on the Practical Application of Cost Work to Management and similar subjects by prominent executives.

Dinner—Astor Gallery, 7 p. m. (Informal).

Tuesday, September 28th

Discussion of Questions on Accounting Problems in the Paper Industry.

Annual Business Meeting.

Dinner, $5.00 per cover.

Meeting of the Northeastern Division A. P. P. M. S. A. a Success

The meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents' Association was held on September 8 at the plant of the Eastern Manufacturing Company at South Brewer, Maine. Superintendents from many of the largest paper mills in Maine, New Hampshire and Massachusetts were in attendance and the meeting was pronounced a big success. The opening address was delivered by Stewart D. Copeland, resident manager of the Eastern Manufacturing Company, who gave the guests a very cordial welcome. The business of the meeting was called to order by H. H. Hackett at 1.30 P. M. Communications were read from pulp and paper men throughout the country expressing their regret at being unable to be present. Chairman Hackett laid stress on the desire of getting a hundred per cent membership representing all the mills of Maine and spoke of the probability of including New Hampshire in their division. At 3:00 o'clock the meeting was adjourned to allow the visitors to make a tour through the mills of the Eastern Manufacturing Company.

An elaborate banquet was served in the dining hall connected with the service department at 5:00 o'clock, at the conclusion of which a very entertaining program was furnished. Dr. Brautlecht of the University of Maine delivered a very interesting paper on the purpose and scope of the pulp and

SAMUEL M. LANGSTON COMPANY

CAMDEN, N. J., U. S. A.

Paper Can Machinery

Complete sets of machinery for making cans such as are used for packing oats, coffee, baking powder, tobacco, snuff and cleansing powder.

Corrugated Paper Shipping Case Machinery

We build all the machinery necessary for the installation of complete plants.

Paper Slitting and Rewinding Machines

Machines for cutting and rewinding roll paper. We build all width machines to handle any weight or thickness paper and any size roll.

The Carthage Machine Company

The Carthage Chipper
BETTER THAN EVER

The Carthage Improved Chip Crusher
AS GOOD AS THE CHIPPER

The NEW Carthage Pulp Shredder
A REMARKABLE PERFORMER
IT DOES WHAT NO OTHER SHREDDER CAN DO

The Carthage Wood Washer
KEEPS DIRT OUT OF YOUR SHEET

The Carthage Ball Bearing Straightway Blow Valve
IT IS VERY DURABLE IT IS EASY TO HANDLE

Barkers	Pumps	Wet Machines
Wood Splitters	Chip Screens	Plug Machines
Pulp Grinders	Sulphur Burners	Bronze and Lead Work

The Carthage Machine Company

Carthage New York

James L. Carey
Paper Mill Architect and Engineer
208 N. Laramie Ave., Chicago, Ill.

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The "Robins Hand Book of Conveyor Practice" will help you solve your conveying problems. Write for a copy.
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Lockport Felt Company
NEWFANE, NEW YORK
MAKERS OF
Fine Felts for Fine Papers
ALSO MAKERS OF
Best Felts for *all* Papers
SATISFACTION GUARANTEED

The Cost of a Paper Machine Wire Can Be Figured Only on the Basis of Service Rendered

1—Rapid strides are being made today in combining materials to produce a result which will give greater service.

2—A metal has been perfected for the manufacture of wires, other than fourdriniers for paper and pulp mills called NICKEL ALLOY.

3—**O'NEILL NICKEL ALLOY** wires have demonstrated by their performance in some of the largest mills of this country, that their life and service show approximately 400% better investment for the pulp and paper manufacturers. Upon request testimonials will be gladly submitted.

4—We recommend that you try the **O'NEILL NICKEL ALLOY WIRES.** They cost more but they are worth it.

5—We also manufacture very durable paper machine wires of brass and bronze in plain, double warp, triple chain, and twisted weaves.

Joseph O'Neill Wire Works
Southport Conn., U. S. A.

paper making course of the University of Maine. He was followed by Hugo Hanson, head of the technical research department of the Eastern Manufacturing Company, who delivered an address on the use of cotton linters in the making of paper. He said that the experiments that this company had had with this material were successful and it is expected that in the near future much of it will be used in paper manufacture, thus relieving the present strain on the forests.

After extending a vote of thanks to the management of the Eastern Manufacturing Company for the cordial reception given the visiting superintendents, the meeting adjourned in time to permit those coming from a long distance to make trains.

Uniform Safety Standards

A movement for uniform industrial safety standards which is proceeding under the auspices of the American Engineering and Standards Committee is well under way. This committe has been assigned the sponsorship of various safety codes being assigned to different organizations, and when formulated, will be recognized as an American standard. It is expected that they will eventually be adopted by various governmental and insurance authorities. The National Safety Council has been assigned the sponsorship for the code on paper and pulp mills. A representative committee has been formed, and the work of formulating this code is now in progress. The first meeting of the committee will be held on Friday morning, October 1, in the Milwaukee Auditorium, Milwaukee, Wisconsin, during the Ninth Annual Safety Congress, which begins on the previous Monday.

Book on Pulp and Paper Making

The new book entitled "Modern Pulp and Paper Making," by G. S. Witham, Sr., Manager of Mills, Union Bag and Paper Corporation, Hudson Falls, New York, is now ready and copies are being distributed to the many subscribers who have been waiting patiently for it to arrive. A great element of pride should exist in the heart of everyone who is interested in the development of the pulp and paper industry in America, that here at last, is a work which has been written by one who is an acknowledged authority on the subject, gained from thirty-seven years of practical experience, and knowing the need for such a book, has given his time and careful attention to the preparation of it.

The various sub-divisions of the art have been carefully treated in a manner that can be understood by the average practical paper maker; the chemical subjects are comprehensible to those having no special knowledge of this science.

The book consists of twenty chapters and the Index, covering six hundred pages, and contains more than two hundred illustrations from photographs, charts and diagrams. Starting with the processes by which pulp is produced, these subjects are treated in the order from sawmill to the finished product. Treatment is given to "The Power Plant;" "Testing of Paper and Paper Materials;" "Paper Defects, Their Cause and Cure," and a number of pages with diagrams cover the subject of "Personnel." "Useful Data and Tables" comprise the last chapter, to-

The FAMOUS *OHIO* BALING PRESS

"Judged by the Companies it Serves"

THE Famous Ohio Baling Press stands in a class by itself. It is superior both in construction and in the method of performing its work to the old fashioned vertical type machine.

1—It is an automatic, continuous duty press—no stops and waste of time in tying or removing bales.

2—It compresses the waste into tighter, smaller, less bulky bales. They are more easily handled and require less storage space.

3—It will bale many times as much waste in a given period as any other press on the market.

4—The Famous Ohio means saving of time, low labor costs, clean plant, and low fire insurance rate.

5—It is a giant for strength, a demon for speed and a mechanical masterpiece.

Famous Ohio Baling Press at its daily work in the plant of The Ashtabula Corrugated Box Co., Ashtabula, Ohio.

Write now for a copy of our new Baling Press Catalog

The Ohio Cultivator *Co.*
BELLEVUE, OHIO

FAMOUS
Ohio
BALING PRESS

FOURDRINIER WIRES

Dandy Rolls *Cylinder Molds*
Brass, Copper and Iron Cloth
Bank and Office Railings

WIRE SIGNS

Cheney Bigelow Wire Works
Established 1842 SPRINGFIELD, MASS.

gether with a complete list of American pulpwoods, showing their range of growth and yield.

The book is bound in blue buckram, size, six by nine, and is a handsome ornament for any library.

The following books are now being published by the T. A. P. P. I.: Paper Testing Methods; Technical Association Papers, Series II; The Creative Workman; and American Woods for Pulp and Paper. Copies of all these can be purchased from the Association by addressing the secretary, Room 1102, 18 E. 41st Street, New York City.

A copy of a book entitled "Data Book for Engineers" has recently been published by the Locomotive Superheater Company, 30 Church street, New York City. The purpose of the book is to assist stationary engineers in their every day work by furnishing them with useful data such as they have occasion to use frequently. It being compiled under one cover, its object is to save time in looking for the data elsewhere. It is securely bound in flexible fabricoid, size four and one-half by seven, and in the back of the book are a number of pages devoted to memorandum and an index to the tables contained in the book. The company will be pleased to furnish a copy to anyone who is actually interested in steam engineering.

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Hammermill Acquires Timber Lands

Guarantee of an adequate supply of pulp wood for making Hammermill Bond and the allied lines, for many years to come was assured last week when negotiations which have been pending for several months were concluded at Montreal by which the Hammermill Paper Company acquired the timber lands and equipment of the Matane Lumber & Development Company in the province of Quebec.

The deal includes saw mills, complete lumbering equipment, logging railroads, considerable development work already done, floating timber and 133,000 acres of heavily wooded spruce land. As the Matane Company had not yet operated very extensively, and had worked only for lumber, not for pulpwood, the tract is nearly all virgin timber.

The property is located on the lower Central part of the Gaspe peninsula, south of the St. Lawrence and does not have riparian frontage on the main river, but is tapped by considerable reaches of the Matane and Cap Chat rivers.

With the property, the Hammermill Company acquired 13,000,000 feet of logs in the river, which will likely be utilized at once.

Officials of the company state that no plans have been made for immediately utilizing the standing timber. The purchase price of the property has not been made public.

Charles P. Cowles

Charles P. Cowles, widely known in the paper manufacturing industry, died at his home, near Rye, N. Y., of injuries suffered in an automobile accident two years ago. He was 61 years old. Mr. Cowles was a pioneer advocate of reforestation and was instrumental in establishing tree nurseries in the province of Quebec and near New Brunswick, Canada.

$1,700,000,000 in Railroad Improvements

Approximately $1,700,000,000 will be expended during the year by the railroads to improve service, according to F. W. Benton, who attended the convention of railroad builders at Chicago.

Included in the new rolling stock to be purchased are 4,000 locomotives, 150,000 box cars and 30,000 gondola cars.

More than 500 members of the Traveling Engineers' Association attended the convention. Discussions on economic measures in railroad building and operation occupied much attention.

Grand Rapids, Wis., is hereafter to be known as Wisconsin Rapids. The change is made on account of the fact that there is a Grand Rapids in both Michigan and Minnesota and on which account considerable trouble was experienced in both mail and freight shipments going to the wrong Grand Rapids.

When buying a pump it is well worth your time to make a careful selection and carefully compare the various features to be considered in choosing the proper pump for the service to be performed. We would like to be of assistance in advising the purchaser the vital points which we consider of importance in making a selection and feel our fifty years' practical experience should be of some value.

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Strength of prices and consistency of demand continue to be the most salient characteristics of the paper market. During recent weeks consumers have let up in their buying operations to a certain degree, but there has been all along more than sufficient demand to absorb the supply of paper available, and now that the fall is drawing nigh and the consumption of various kinds of paper is increasing—as it invariably does at this season—buyers are commencing to look about for larger amounts of paper. The market therefore is taking on a livelier aspect, which condition gives every promise of becoming accentuated as the season progresses.

That a runaway market is likely to develop within the next several months is the one fear expressed by users of paper, who consequently are exerting every effort to cover forward requirements as best they can without creating undue excitement in the trade. It is openly conceded by consumers that the present production of paper mills of the country does not begin to cover the needs of all the users of paper, the great majority of whom are today consuming more than normal tonnages. Whether or not the new machines being installed in mills will effect the increase in supplies necessary to satisfy the wants of buyers remains to be seen. When all of these machines are in operation, there will likely be enough paper to go around, but present prospects are that the supply situation will revert to the acute stage existing last spring before manufacturers are enabled to increase their output sufficiently to take care of the expansion of consumption that usually occurs in the fall of the year.

Users of paper have long since realized that the fundamental cause of the tight supply conditions and high prices is nothing else but that a broad gap exists between production and consumption, as was inevitable with the former running around 115 per cent of normal and the latter reaching at least 150 per cent of normal. In other manufactured commodities, notably textiles of various kinds, a fictitious supply situation has prevailed in recent months. Production has been more than ample to fill the wants of consumers, but prices have been carried skyward largely because of control of supplies, although there is no denying that heavier costs of manufacture have warranted large increases in prices on the finished products. The prevailing situation in paper, however, has been brought about solely and simply by a tremendous jump in consumption and the inability of producers to keep pace with the increased use of the commodity. Paper consumers therefore no longer permit questions of price to stand in their way of securing the supplies needed. When paper is found available, it is quickly snapped up by buyers regardless of the price asked for it. Moreover, there is every reason to believe that consumers will keep on buying in equally as large volume if prices go higher, for the one idea of the buyer today is to cover requirements irrespective of cost.

Looking about the chief paper consuming trades, one finds conditions obtaining that seem to insure a continuance of heavy consumption for quite a spell. Business in various commodity lines is not quite as brisk as it was before the summer set in. This means that manufacturing and retailing houses are conducting a greater number of and more extensive canvassing campaigns, resulting in a larger consumption of paper. Printing establishments are exceedingly busy; most of them are working double shifts to put out all the work they are asked to do. Paper box manufactories are running at a lively clip and activity in their line is broadening every day, with the fall holding prospects of exceeding all records in volume of business. Department stores are doing a favorably large business, and there is every indication retail merchandising will increase in scope this fall and winter as it never has before. Another bullish factor is that paper is being substituted in numerous directions for textile materials owing to the high cost of the latter. Particularly is this true in respect to the use of paper for wrapping purposes instead of cotton goods; paper bags are taking the place of cotton and burlap sacks for flour, sugar and various other commodities.

The outlook for the industry is very gratifying; possibly never heretofore has it been more promising.

Mr. Clarence P. Robinson formerly connected with the Mill Supplies Dept. of Parsons & Whittemore, Inc., New York, has associated himself with Daniel M. Hicks, Inc., 200 Fifth Avenue, and has assumed the management of the department embracing Pulps, Chemicals, Casein, Clay, Colors, Wires, Felts, etc. Mr. Robinson was for over 12 years connected with the Cherry River Paper Co. at their sales offices in Philadelphia as well as at their mills in Richwood, W. Va.

Maurice O'Meara Company, paper dealers and exporters of 448-450 Pearl street, New York, has increased its capital stock from $100,000 to $500,000, notice of same having been filed with the Secretary of State of New York at Albany, N. Y.

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Papermaking Rags

The market for papermaking rags is gradually improving in activity. After keeping out of view as buyers for some time excepting as regards small amounts of stock needed for immediate use, consumers are commencing to purchase against fall requirements and are placing orders for comparatively large quantities of rags. Dealers are exceedingly bullish in their views and are demanding firm prices, particularly on forward commitments, it being their contention that with everything pointing to a further advance in values they are not justified in accepting future contracts unless getting prices protecting them in the event the market rises. While probably the lightness of accumulations throughout the country is being exaggerated to an extent, it appears that there are few sizable lots of unsold rags in packers' hands. Collections of rags this year have not been up to normal, owing to the economy practiced by the general public in discarding old garments and also owing to the heavy consumption of rags by paper and other mills, and indications are it would not require a whole lot to send prices bounding upward at a rapid rate. Evidently appreciating this, paper manufacturers are buying in as guarded a manner as posible, doing everything they can to keep from exciting the market.

New cuttings display an especially firm undertone and prices are at high levels. White shirt cuttings of No. 1 quality have sold at as much as 25 cents a pound, while fancy shirt cuttings are bringing 14 to 14.50 cents, unbleached muslins 17.50 cents and No. 1 washables 11 cents. Old white rags are priced at quotable basis of about 14 cents for No. 1 repacked stock, old thirds and blues at 4.50 cents and street soiled whites at 4 cents. Roofing rags are moving into consuming channels in increasing volume at 2.40 to 2.60 cents for No. 1 packing. With fewer foreign rags of roofing quality available at present, felt manufacturers are looking more to the domestic market for supplies. Quotations f. o. b. shipping points are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	24.00-25.00
White shirt cuttings, No. 2	14.50-15.00
Fancy shirt cuttings	14.00-14.50
Washables, No. 1	11.00-11.50
Unbleached muslins	17.50-18.00
White lawns	19.00-20.00
Overall cuttings, blue	13.00-13.50
Black silesias	7.50- 8.00
Old Stock—	
Whites, No. 1 repacked	14.00-15.00
Whites, No. 2 repacked	7.50- 8.00
Whites, house soiled	4.50- 4.75
Whites, street soiled	4.25- 4.50
Thirds and blues, repacked	4.25- 4.50
Thirds and blues, rough	3.75- 4.00
Black stockings	4.50- 4.75
Lace curtains	9.25- 9.50
Cotton canvas, No. 1	5.50- 6.00
White cotton batting	4.75- 5.00
Roofing, No. 1	2.40- 2.60
Roofing, No. 2	2.30- 2.40

Rope and Bagging

There is a fairly steady demand for old rope and prices on this commodity hold quotably unchanged after the recent decline. Scrap bagging, on the other hand, is little wanted by papermakers and those few mills in the market as buyers are getting such supplies as they want at practically any price they choose to offer so long as they are within reason. Stocks of rope are no more than normal, if anything, dealers haven't usual accumulations on hand, whereas bagging is held in plentiful amounts and sellers are having difficulty in moving sizable quantities. No. 1 Manila rope is selling at around 6.25 cents per pound at shipping points, with quotations ranging a quarter of a cent on either side of this figure. Strings are in demand and are bringing 3 to 3.25 cents in sales to mills. No. 1 scrap bagging is offered at 2.50 cents and is obtainable at lower prices in some quarters. Quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	3.00-3.25
Gunny, No. 1 foreign	3.00-3.25
Scrap bagging, No. 1	2.40-2.60
Roofing bagging	1.50-1.60
Wool tares, heavy	3.25-3.50
Wool tares, light	3.00-3.25
Manila rope, No. 1 foreign	6.00-6.50
Manila rope, No. 1 domestic	6.00-6.50
Sisal strings	3.40-3.60
Mixed strings	3.00-3.25

Old Papers

Waste paper is in good demand and a steady tone marks prices. Consuming mills are placing orders in consistent fashion and are freely meeting most of the prices asked by packers, indications being that old paper stock is a relatively cheaper commodity

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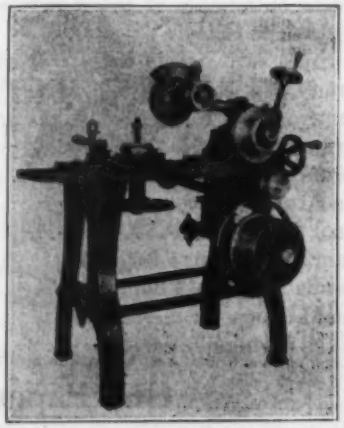

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today than wood pulp despite the high prices prevailing. Packers assert that they are not beginning to get usual amounts of waste paper of any kind, and more especially the high grades, from producing sources. Print shops, department stores and other large users of paper are said to be economizing in every possible way, with the result that there is less old paper available than when conditions in the new paper field are more normal. In contrast to this supply situation, there is a heavy consumption of waste paper by board, felt, wrapping and book mills, which are using substitute stock in every instance they can so as to conserve supplies of wood pulp; under which circumstances it is not surprising prices on waste paper are at record heights and evince a tendency to rise still further.

Sales of No. 1 hard white shavings have been recorded at 9 cents per pound at shipping points and of soft white shavings of No. 1 quality at 8 cents. Some supply of shavings is obtainable under these figures, but packers are demanding such prices for choice packing and are offering but limited tonnages at these levels. Folded newspapers are selling at close to 2.50 cents per pound, transactions at 2.40 cents having been definitely noted. No. 1 mixed paper is quotably firm at 2 cents and higher, while heavy No. 1 book stock is bringing 3.25 to 3.50 cents, No. 1 overissue news 2.65 to 2.75 cents and white blank news cuttings 6.50 cents. Quotations f. o. b. shipping points are:

	New York and Chicago
Hard white shavings, No. 1	8.50-9.00
Hard white shavings, No. 2-3	7.00-7.50
Soft white shavings	7.50-8.00
Colored shavings	5.00-5.50
Heavy book, No. 1	3.25-3.50
Crumpled, No. 1	2.75-3.00
Ledger stock	4.00-4.25
Kraft, No. 1	5.75-6.00
Manilas, No. 1	3.00-3.25
White blank news	6.25-6.50
Overissue news, No. 1	2.65-2.75
Folded news	2.40-2.50
Mill wrappers	2.20-2.30
Box board cuttings	2.10-2.20
Mixed paper, No. 1	2.00-2.10
Common paper	1.60-1.70

Chemical Pulp

As the fall draws nearer, inquiry for chemical wood pulp shows expansion and every factor in the market seems to point to further advance in values. Probably never before have unsold stocks of sulphite been at such a low level as at present. Producing mills are mostly sold out, many of them well into 1921, and haven't any worthwhile tonnage to offer for either prompt or future delivery, while practically no sulphite is being received from Scandinavia except on contract. Pulp manufacturers who have purposely

What Every Paper Maker Should Know

1. The approved modern methods of testing paper should be familiar to every progressive paper maker. By reading "Paper Testing Methods," published by the Technical Association of the Pulp and Paper Industry, information can be gained respecting the examination of paper fibers by microscopical, chemical and physical means. The instruments employed are described and illustrated and directions are given for the preparation of staining solutions and chemical reagents. The volume can be obtained for $1, postage prepaid, by addressing the secretary of T. A. P. P. I., Room 1102, 18 East Forty-first street, New York.

2. Every mill superintendent, engineer or chemist should possess a copy of "Technical Association Papers, Series II." It is a cyclopedia of mill and laboratory theory and practice. In addition to a complete descriptive list of books and periodicals pertaining to pulp and paper manufacture, there are articles on Analytical Methods; American Papermaking Clays; Making Cellulose from Cotton Linters; History of the Sulphite Process; Soda Mill Problems; Tearing Tests for Paper; Testing Methods for Sulphite Acid; Discussions of Heat, Light and Power Problems; Handling of Woodroom Refuse; Principles of Accounting and Control of Industrial Power Plant Costs; Mill Lighting Systems; Sizing Up Men for Positions; Important Factors in Grinding Wood for Pulp, etc. Price $2 postpaid. Send cash with order to T. A. P. P. I., Room 1102, 18 East Forty-first street, New York.

3. Do you wish to know how the joy of work can be stimulated and industrial efficiency enhanced through creative workmanship—all with reference to the operations of a Pulp and Paper Mill? Then read "The Creative Workman," by Robert B. Wolf. Published by T. A. P. P. I. at 25 cents.

4. Are you interested to know the native American woods that are suitable for paper pulp manufacture? A pamphlet telling all about the character and yields of pulp that may be expected from different woods may be obtained by ordering "American Woods for Pulp and Paper." Obtainable at 25 cents a copy, postpaid, from T. A. P. P. I., Room 1102, 18 East Forty-first street, New York.

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refrained from disposing of all their output on contract are reluctant to enter into commitments even at prevailing attractive prices for the reason they desire to hold onto unsold supplies to insure that their own needs will be covered, and buyers in search for available pulp are experiencing much difficulty in finding it. In fact, there is a large potential demand going unfilled, and there is nothing visible in the market indicating that this demand will be supplied for some time.

Prices in Scandinavia remain on levels out of parity with values ruling in the United States and importers are confining their purchasing activities on the other side of the Atlantic almost solely to pulp on contract to mills here. There appears little hope of shipments from Norway and Sweden increasing between now and the time when the Baltic closes for the winter because European consumers are absorbing the great bulk of Scandinavian output and paying higher prices than American buyers are willing to grant. Quotations f. o. b. domestic pulp mills are:

Bleached sulphite	12.00-14.00
Easy bleaching sulphite	10.00-10.50
News grade sulphite	8.00- 8.50
Soda pulp, bleached	8.50- 9.00
Mitscherlich unbleached	9.00- 9.50
Kraft, No. 1	7.50- 7.75
Screenings, refined	3.00- 3.25

Mechanical Pulp

Available supplies of ground wood pulp continue at a low ebb, and with demand from consuming sources showing little or no let up, prices are strongly maintained. Prime spruce pulp for prompt shipment is readily selling at $140 to $150 per ton at grinding plants, and sales are being made in some cases at beyond these figures. Water conditions this summer have been fairly favorable to manufacturers, but delays in receiving pulp wood because of the railroad situation have kept production down to a point where it has scarcely reached normal tonnages, and there is very little ground wood stored up against fall requirements, whereas usually at this time of the year grinders have appreciably large stocks on hand. Predictions are freely made by authoritative members of the trade that prices will go substantially higher, and certainly at present opinions in this connection seem likely to be confirmed.

Chemicals

A feature of the market for pulp and papermakers' chemicals is the strong position of bleaching powder. Spot lots of bleach in domestic drums is selling at 7 cents per pound and higher at producers' works, while contracts covering future deliveries are being made at around 6.50 cents. Brimstone is quotably firm at $18 to $20 per ton at mines and is in steady demand. Casein is moving toward consumers in consistent fashion at a quotable range of 14 to 16 cents. Quota-

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Alum, lump starch	8.50- 9.00
Alum, powdered	5.00- 5.50
Blanc fixe, powdered	5.50- 6.00
Bleaching powder (domestic drums)	7.00- 7.25
Brimstone (ton)	18.00-20.00
Casein	14.00-16.00
Caustic soda, spot delivery	6.50- 7.00
China clay, domestic, washed	12.00-15.00
China clay, foreign	18.00-26.00
Rosin, grade E	15.75-
Satin white	2.75- 3.00
Soda ash, 58 per cent light (bags)	3.00- 3.50
Sulphite of alumina, commercial grade	2.75- 3.00
Starch, Globe, in bags	5.47-
Talc (ton)	18.00-20.00

Direct Mail Convention

If you write letters, if you use circulars, if you publish a house organ, if you advertise anything, anywhere, at any time, through the medium of direct-by-mail publicity—then you are bound to get real dollars and cents results by attending the Direct Advertising and House Organ Convention which will be held at Detroit (Board of Commerce), on October 27th, 28th and 29th, 1920. The committee in charge of the convention are emphasizing the fact that it is to be a wide-open meeting in every respect, and not strictly a "members only" gathering. A long list of well-known advertising men are to speak on subjects in which they are specialists.

The American Writing Paper Company of Holyoke, Mass., has recently increased the personnel of its advertising department to include L. B. Springsteen, who for a number of years has been Superintendent of Printing of the Strathmore Paper Company. He will now have charge of the printing production of "Eagle A" advertising department.

Economy Fuse and Mfg. Co. Makes Change

S. W. Fries has been appointed district sales manager for Kansas City territory of Economy Fuse & Manufacturing Company with offices at 1205 Commerce Bldg., Kansas City, Mo.

Mr. Fries succeeds R. P. Crawley who has resigned the position to take over the active management of the Crawley Electric Company of Peoria, Ill.

Mr. Fries takes his new position with a long and thorough experience and wide acquaintance with the electrical field. He has beer with Economy Fuse & Manufacturing Company for a number of years, his service with the house being interrupted only by the time he devoted to patriotic duty in France.

Mineral oil will wash out of fabrics, while vegetable oils will not.

STANDARD BLEACHING POWDER

Manufactured by

Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

Have You Tried Cotton Linters for Paper Stock?

It Will Pay You to Figure With Us

Our organization covers the South

Steele By-Products Co., Inc.
DEALERS IN
Cotton—Linters—Waste
GENERAL OFFICES AND WAREHOUSES
BIRMINGHAM, ALABAMA
305-6 Slaughter Bldg. DALLAS, TEX.
1013 Hearst Bldg., CHICAGO, ILL.

SIGNODE SYSTEM

Framed Reams, strapped with Signode System

Signode straps insure delivery of framed paper bundles in the same condition they leave the mill. Cheaper than rope. No battered corners. Liberal trial arrangement.

Write for Particulars and Prices

The Signode System, Inc.
564 W. Adams Street CHICAGO, ILL.

THE WORLD'S BEST FILLER

ASBESTINE PULP

(Reg. U. S. Pat. Office)

Finest White Color **Natural Fiber** **Retention 90%**

Every Way Superior to Clay

Prompt Shipments Guaranteed—Largest Mills in the World

INTERNATIONAL PULP CO., 41 Park Row, New York

RUSS GELATIN CO.

Factory—WESTFIELD, MASS.

MANUFACTURERS OF

GELATIN and GLUE

ANIMAL SIZING GLUE STOCK

LARGEST SPECIALISTS IN AMERICA ON

FINE WRITING PAPER SIZING

E. F. RUSS COMPANY 201 Devonshire S. BOSTON, U. S. A

A. SALOMON, Inc.

EMANUEL SALOMON, President

15 Park Row *New York*

Paper Makers Supplies

SOLE AGENTS U. S. *and* CANADA *for*

GASTON CAHEN & CO. *Ghent, Belgium*

J. ROZES AINE *Agen, France*

JEAN SOULIER *Rouen, France*

LEON MOIRAND *Annonay, France*

PAPER MAKERS' *Alum*

(BOTH COMMERCIAL and FREE FROM IRON)

Casein, Satin White, English China Clay, Crystal Boro Phosphate

The **Kalbfleisch Corporation**

31 Union Square West NEW YORK, N. Y.

IMPORTED TALC DOMESTIC

We are also Headquarters for:

BLACKS
COLORS
FILLERS

BINNEY & SMITH CO.

81 Fulton Street New York

ESTABLISHED 1892.

Vito G. Cantasano & Bros.

PACKERS AND WHOLESALE DEALERS

PAPER STOCK, COTTON AND WOOLEN RAGS.

396 PEARL STREET 34 VANDEWATER ST

OFFICE: 185 SOUTH STREET

353 WATER STREET 5-7-9 JAMES SLIP

NEW YORK

New Papers

Writing—	
White rag	30-50
White sulphite, No. 1	18-24
Colored	20-30
Ledger—	
White rag	30-55
White sulphite	20-30
Colored sulphite	22-
Colored rag	32-
Bonds—	
White rag	20-50
White sulphite	18-30
Colored sulphite	20-30
Colored rag	22-
Book—	
No. 1 S. & S. C.	16.00-18.00
Machine finished	15.00-16.00
English finished	17.00-19.00
Coated and enameled	18.00-20.00
Lithograph, M. F.	19.00-20.00
News Print—	
Rolls, contract	5.50- 6.00
Rolls, transient	12.00-
Sheets	12.50-13.50
Side runs	7.00-
Cover Stock—	
Coated, both sides	12.25-
Coated, one side	12.20-
Wrappings—	
No. 1 kraft	12.00-13.00
No. 2 kraft	11.00-12.00

Boards—	New York and Chicago
Solid news	125.00-135.00
Straw	100.00-110.00
Plain chip	115.00-120.00
White coated chip	140.00-150.00
Manila coated chip	135.00-145.00
Binders board	140.00-150.00

Maurice O'Meara Company, paper dealers and exporters of New York, has opened a branch office in the Holyoke National Bank Building in Holyoke, Mass., under the management of Charles R. O'Neill to handle all grades of paper and paper makers' supplies.

The capital of the Underwood Paper Mills at Plattsburg, N. Y., has been increased from $300,000 to $500,000.

News Personals

Dr. Hugh P. Baker, secretary of the American Paper and Pulp Association, journeyed to his old home in Wisconsin to spend his vacation, passing most of the month of August in the West.

Lawrence Stedman has joined the selling force of Blake & Decker, Inc., paper dealers and mill agents of 501 Fifth avenue, New York. Mr. Stedman was connected with the American Writing Paper Company for upwards of twelve years and his experience at the Holyoke mills and in the sales department of that company makes him a very capable salesman.

Karl Becker, head of the paper department of the Hart Trading Company, 154 Nassau street, New York, is now in Europe, the purpose of his trip abroad being primarily to study pulp and paper market conditions in the Scandinavian countries.

Arthur H. Nevius of the Miami Paper Company, West Carrollton, O., who is western vice president of the American Paper and Pulp Association, will act as chairman of a western committee on arrangements for the November conference of that association to be held at the Congress Hotel, Chicago, on November 11. The morning session will be held in the Elizabethan Room and the luncheon and afternoon meeting in the Gold Room of the Congress Hotel.

James Quinn, formerly with the Belleville Paper Company, of Belleville, Ontario, manufacturers of strawboard, and more recently with the Union Paper Mills of Monongahela, N. Y., is the new superintendent of the plant of Hinde & Dauche, manufacturers of container board, at Watertown, N. Y. He succeeds William Westcott, who is now superintendent of the Rock City Falls Mills.

The Main Paper Stock Company, large packers of paper makers' supplies in New York, will shortly establish a branch at Mayagnez, Porto Rico. The branch will be in charge of Vincent Bartella, who will conduct a general import and export business, principally in paper and paper stock.

The offices of the New York Overseas Company, Inc., importers and exporters of wood pulp and paper, have been removed from 17 Battery Place to the Curb Building at 20-44 Beaver street, New York, where they take up an entire floor.

E. J. KELLER COMPANY
INCORPORATED
200 FIFTH AVENUE
NEW YORK

FOREIGN AND DOMESTIC
PAPER MAKERS' SUPPLIES
COTTON, JUTE AND FLAX WASTES
COTTON BAGGING MATERIALS
EAST INDIA MERCHANDISE

J. ANDERSEN & CO.
FREDERICK BERTUCH, SPECIAL PARTNER
21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden;
Bergvik and Ala Nya Aktiebolag, Söderham, Sweden

30 Years Exporting American Paper

Our Markets: The World outside of U. S. A. and Canada.
Our Organization: Ten selling offices, besides salaried travellers and local representatives.
Our Demand: An established clientele, constantly being increased, by an aggressive sales policy.
Our Supply: Your Mill?
Present conditions in America are temporary.
Have you considered what a first-class export outlet would mean to you, with its assurance of steady demand?

Parsons Trading Company
17 Battery Place NEW YORK

London, Stockholm, Sydney, Melbourne, Wellington
Bombay, Mexico, D. F., Havana, Buenos Aires, Rio de Janeiro

We are Manufacturers and Exporters of
PAPER
also Importers and Jobbers

MAURICE O'MEARA CO.
448-50 Pearl Street NEW YORK CITY

SALOMON BROS. & CO.
Importers and Exporters of
Cotton, Cottonwaste, Linters, Ramie, Jute, Rubber
Import of All Grades of Rags and Rope
200 Fifth Ave., NEW YORK

DANIEL M. HICKS
INCORPORATED
IMPORTERS DEALERS
ESTABLISHED 1895
Foreign and Domestic
Rags, Bagging, Rope and Waste Paper
Pulp, Chemical, Colors, Wires, Felts, Clay, Casein, etc.
200-5th AVENUE, NEW YORK CITY

Chemical Pulp

There is little increase in the amount of wood pulp being received in the United States from Scandinavian countries. Prices in primary markets are so far beyond a parity with those ruling here that importations have been brought very nearly to a standstill excepting as concerns pulp bought on the other side on contract. From all indications, there seems little hope of market conditions in Scandinavia becoming more favorable to American pulp consumers for some time to come. British papermakers have contracted for the bulk of the Swedish and Norwegian output, and such supplies as remain unsold are being rapidly snapped up by European buyers at prices substantially above our domestic market levels, with the result that importers here do not feel justified in placing orders covering forward shipments of pulp unless for the account of mill customers.

Unbleached sulphite of No. 1 quality is held at prices equivalent, even at the low rate of exchange, at about 10.50 cents per pound ex dock on this side. Very few offerings of any kind involving bleached sulphite are being made, and the scattered ones coming forward invariably concern pulp of secondary quality for which producers ask in the neighborhood of 17 cents a pound. Kraft pulp is available in slight amounts on the spot here at around 8 cents ex dock. Foreign easy bleaching sulphite is hard to get, as is Mitscherlich, and prices are mainly nominal. Receipts at New York and current ex dock quotations follow:

Bleached sulphite	$17.00-
Unbleached sulphite, No. 1	10.50-11.00
Easy bleaching	11.00-11.50
Mitscherlich unbleached	11.00-11.50
Kraft	8.00- 8.25

National Bank of Commerce, 1,980 bls. from Christiania; J. Andersen & Co., 1,350 bls. from Christiania; Tidewater Paper Mills Co., 14,562 bls. ground wood from Clarke City, Quebec, and 2,325 tons ground wood from Halifax; W. & S. Jeb & Co., 750 bls. ground wood from Lewisport, N. F.; Order, 800 bls. from Christiania.

Paper Stock

A sharp drop in receipts of foreign papermaking materials at the port of New York occurred in August, this being due apparently to the lower prices prevailing in the market here for such goods and the resultant decreased buying by importers on the other side. Importers assert that they can not bring in rags, bagging and similar material and sell at a profit to paper mills in competition with domestic stock because of the low level of prices on the latter. It is understood that rag merchants in France, Holland, England and other European countries have large supplies on hand, but they are holding for better values. Receipts at New York during August were as follows:

Old Rope

Chemical National Bank, 84 bls. from Rotterdam; Maurice O'Meara Co., 125 coils from Rotterdam; International Purchasing Co., 47 bls. from Bordeaux, 1,457 bls. from Hull, 107 bls. from Bristol, 61 coils from Rotterdam, 40 coils from Christiania; Guaranty Trust Co., 93 bls. from Copenhagen; E. J. Keller Co., 84 bls. from Roterdam; N. E. Berzen, 109 coils from Hull; Salomon Bros. & Co., 143 bls. from Manchester.

Old Bagging

Mente & Co., 99 bls. from Manchester; Mechanics & Metals National Bank, 132 bls. from Manchester; W. J. Jones & Co., 210 bls. from Antwerp; Edwin Butterworth & Co., 67 bls. from Liverpool; E. J. Keller Co., 110 bls. from Copenhagen; Bank of Montreal, 116 bls. from Liverpool; British Bank of South America, 381 bls. from Manchester; Order, 63 bls. from Rouen.

Rags

A. Salomon, Inc., 81 bls. from Bordeaux; Albion Trading Co., 8 bls. from Glasgow, 101 bls. from Manchester; American Woodpulp Corp., 114 bls. from Hamburg; A. J. Bracher & Co., 20 bls. from Liverpool; Castle, Gottheil & Overton, 508 bls. from Havre, 191 bls. from Bordeaux, 80 bls. from Rotterdam; A. Katzenstein, 233 bls. from Havre; E. J. Keller Co., 251 bls. from Rotterdam; Parsons & Whittemore, 40 bls. from Rotterdam; Salomon Bros. & Co., 120 bls. from Rotterdam; 56 bls. from Hull; Wilkinson Bros. & Co., 262 bls. from Rotterdam; Agent De La Cie, 32 bls. from Bordeaux; Gatti-McQuade Co., 103 bls. from Rotterdam; Main Paper Stock Co., 183 bls. from Rotterdam; R. Goldstein & Son, 84 bls. from Rotterdam; Maurice Frank, 37 bls. from Rotterdam; Jaffe & Co., 54 bls. from Rotterdam; Atlantic National Bank, 20 bls. from Bordeaux; Standard Bank of South Africa, 525 bls. from Bristol, 84 bls. from Glasgow; Equitable Trust Co., 18 bls. from Antwerp, 152 bls. from Havre; National City Bank, 202 bls. from Havre; W. Van Doorn, 948 bls. from Rotterdam; Goldman, Sachs & Co., 124 bls. from Bordeaux; W. Schall & Co., 101 bls from Hamburg, 806 bls. from

DIAMOND ALKALI COMPANY

MANUFACTURERS OF

Soda Ash 58%

Modified Sodas

ALKALI

Caustic Soda 76%

Special Alkalies

BICARBONATE OF SODA, U. S. P.

Our complete Works, located at Painesville, Ohio, directly situated on three Trunk Line Railroads, are in position to serve you to advantage.

Address inquiries and communications to our general offices at

PITTSBURGH PENNSYLVANIA

YOUR PRODUCTION!

$$P = \frac{WTS}{600} - B$$

P=Production of salable paper in lbs. per hour.
W=Weight in lbs. of one ream (24 x 36-500).
T=Trim of paper in inches.
S=Speed of machine in feet per minute.
B=Lbs. per hour of paper lost in breaks or made unfit for sale.

Of the factors in the above formula by which you can determine YOUR production, T and W are fixed at predetermined values. But the values of S and B are variable and depend upon the equipment of the machine. Suction Rolls increase S and almost entirely eliminate B. The value of P then becomes much greater. Isn't that what YOU desire?

The Sandusky Foundry & Machine Co.

Sandusky, Ohio

Havre; Order, 581 bls. from Rouen, 220 bls. from London, 142 bls. from Hamburg, 13 bls. from Liverpool, 76 bls. from Havre, 1,155 bls. from Bordeaux.

Miscellaneous Paper Stock

Castle, Gottheil & Overton, 75 bls. from Bordeaux, 24 bls. from Dublin, 61 bls. from Rotterdam; E. E. Marks, 45 bls. from Bordeaux; A. Salomon, Inc., 40 bls. from Bordeaux; Maurice O'Meara Co., 148 bls. from Bordeaux, 38 bls. from Liverpool; Paul Berlowitz, 749 bls. from Bordeaux; Parsons & Whittemore, 148 bls. from Rotterdam; Main Paper Stock Co., 145 bls. from Rotterdam; Gatti-McQuade Co., 276 bls. from Rotterdam; Wilkinson Bros. & Co., 203 bls. from Rotterdam; Maurice Frank, 142 bls. from Rotterdam; E. J. Keller Co., 186 bls. from Rotterdam; American Express Co., 107 bls. from Glasgow; R. F. Downing & Co., 92 bls. from Manchester; Foreign Trade Banking Corp., 75 bls. from Manchester; W. Hughes & Co., 150 bls. from Dublin; American Exchange National Bank, 325 bls. from Dublin; Irving National Bank, 197 bls. from Dublin; Edwin Butterworth & Co., 111 bls. from Dublin; Chase National Bank, 100 bls. from Kobe; Dallas Waste Mills, 17 bls. from Rotterdam; First National Bank of Boston, 91 bls. from Manchester; Brown Bros. & Co., 25 bls. from Manchester; Order, 190 bls. from Glasgow, 24 bls. from Liverpool.

Paper

Receipts of cigarette and hanging papers from foreign sources are fairly large, otherwise the importation of paper into the United States amounts to little importance at present. Our foreign trade in paper—eliminating the two aforementioned grades—is mostly in one direction, namely, outward; the United States today is importing by far a greater tonnage of paper than she is importing. Receipts at the port of New York in August follow:

Cigarette

R. J. Reynolds Tobacco Co., 330 cs. from Bordeaux; P. J. Schweitzer, 248 cs. from Marseilles, 20 cs. from Genoa, 262 cs. from Bordeaux; Liggett & Myers Tobacco Co., 32 cs. from Havre; American Tobacco Co., 305 cs. from Havre, 1,400 cs. from Bordeaux; A. S. Hermann, 2 cs. from Rotterdam; Rose & Frank, 13 cs. from Havre; Wilkinson Bros. & Co., 14 cs. from Havre.

Hanging

Cowtan Bros., 1 cs. from Southampton; Happell & McAvoy, 3 cs. from Hamburg; W. H. S. Lloyd & Co., 62 bls. from Liverpool; A. Murphy & Co., 43 bls. from Liverpool; Bech, Van Siclen & Co., 13 cs. from Kobe; A. C. Dodman, 13 bls. from Liverpool; R. F. Downing & Co., 2 pkgs. from London; F. G. Emmerich & Co., 2 cs. from Havre; R. F. Lang, 16 bls. from London; T. M. Lash, 6 cs. from London; Order, 29 bls. from London.

Importers of

SCANDINAVIAN

PULP

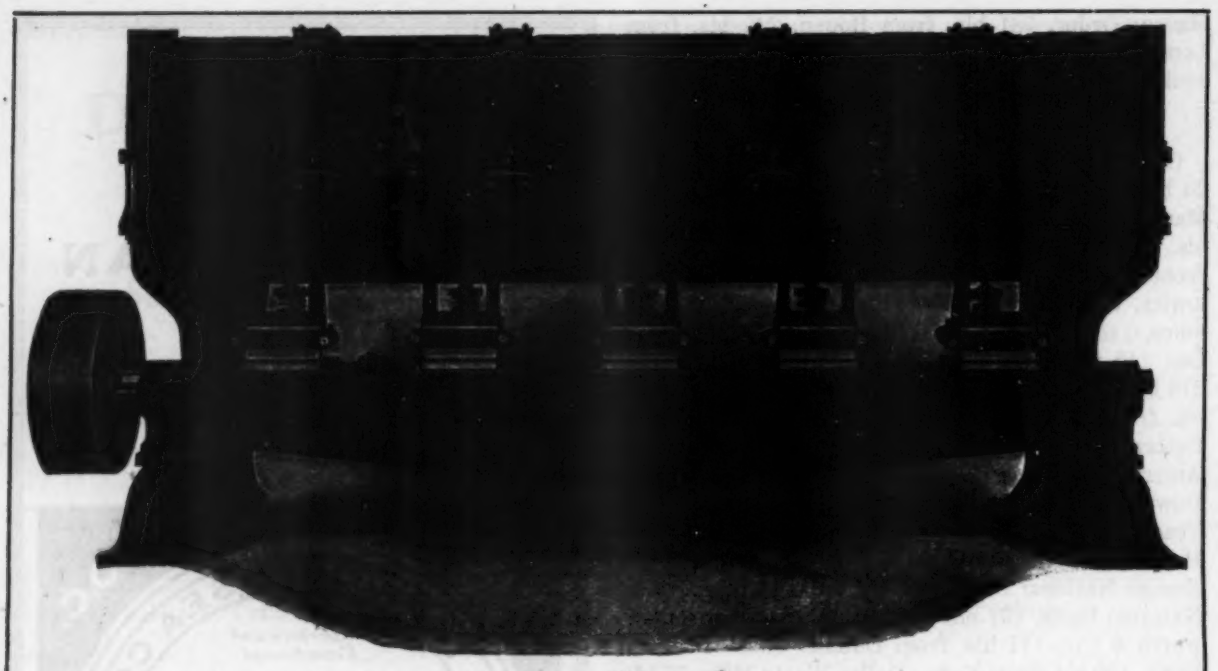
and Exporters of

AMERICAN-MADE

PAPER

New York Oversea Company

17 Battery Place NEW YORK CITY



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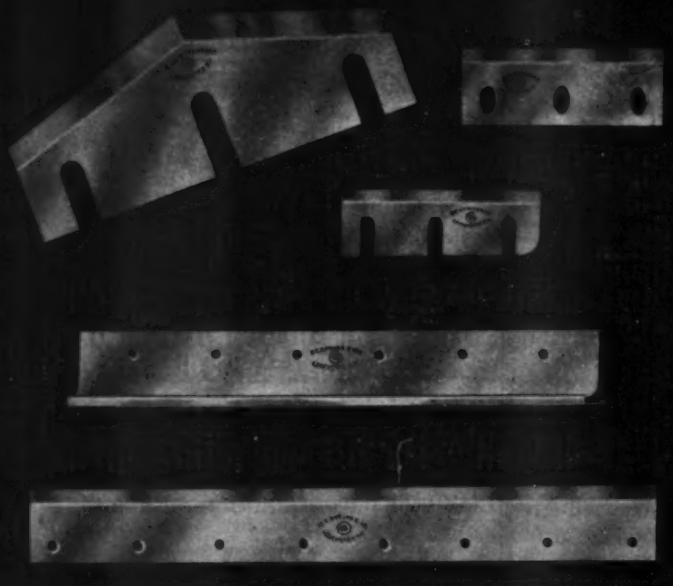


The Demand for Maximum Production

is answered by the superior performance of

Atkins Silver Steel

Barkers, Chippers, Cutters and Planers.

Their excellent material, temper and workmanship assures you of knife satisfaction and we solicit a trial for them.

Write for our Machine Knife Booklet.

E. C. ATKINS & COMPANY, Inc.

Home Office and Factory: INDIANAPOLIS, IND. *Machine Knife Factory:* LANCASTER, N. Y.

Printing

Oxford University Pres, 29 cs. from Liverpool; New York Oversea Co., 319 rolls from Christiania; B. F. Drakenfeld & Co., 98 bls. from Liverpool; Knapp & Baxter, 299 rolls and 380 bls. from Yokohama.

Writing

G. S. Baker, 1 cs. from Southampton; Rikker Bros., 25 cs. from Rotterdam; D. J. Caenca, 4 cs. from Havre; Universal Shipping Co., 3 cs. from Hamburg; Meadows, Wye & Co., 2 cs. from London; C. H. Bouly, 10 cs. from Bordeaux; L. Erstein & Bros., 2 cs. from Bordeaux.

Drawing

E. Dietzgen & Co., 53 cs. from Rotterdam; Lunham & Moore, 3 cs. from London; Order, 3 cs. from London.

Filter

M. Warren & Co., 34 bls. from Bordeaux; Lunham & Moore, 14 cs. from London; E. Fougera & Co., 87 cs. from Bordeaux; Order, 1 cs. from London.

Miscellaneous

Henry Lindenmeyer & Sons, 200 bls. strawboard from Rotterdam; J. L. Porter & Co., 4 cs. from Rotterdam; Newark Paraffine & Parchment Paper Co., 143 pkgs. from Rotterdam; C. Wildemann & Co., 7 cs. from Rotterdam; American Shipping Co., 2 pkgs. from London; Kronfeld, Saunders & Co., 9 cs. from Havre; Tice & Mynch, 2 cs. from Havre; H. C. Davison & Co., 6 cs. from Yokohama; Chatham & Phenix National Bank, 53 cs. from Yokohama; Metropolitan Importing Co., 21 cs. from Hamburg; International Forwarding Co., 3 cs. from Hamburg; G. W. Sheldon & Co., 2 cs. from Hamburg; A. Frankan & Co., 3 cs. from Hamburg; Guaranty Trust Co., 2 cs. from Hamburg; Bendix Paper Co., 46 cs. from Hamburg; C. A. Johnson & Co., 53 bls. from Liverpool; R. F. Lang, 12 bls. from Liverpool; Meadows, Wye & Co., 6 cs. from Liverpool; H. Lips, 97 cs. from Bordeaux; Perkins-Goodwin Co., 88 rolls from Vera Cruz; A. Medina & Co., 40 bls. from Barcelona; Happel & McAvoy, 3 cs. from Havre; Order, 10 cs. from Hong Kong, 12 cs. from London.

At the invitation of Alfred A. Srere of Srere Bros. & Co., Franklin, Ohio, the Peninsular Paper Company baseball team of Ypsilanti, Michigan, went to Franklin, August 22nd, and played the Patent Vulcanite Roofing Company of that city, defeating the local team by a score of 8 to 1. The players were given a very cordial reception by Mr. Srere and the Patent Vulcanite Roofing Co. and enjoyed the trip immensely.

The International Paper Company, 30 Broad street, New York City, announces in response to many inquiries that the company is not affiliated or connected in any way whatever with the paper mill building plans of Mr. Jason Rogers or any of his other projects.

The
C. L. LaBOITEAUX CO.
Cincinnati Chicago Cleveland New York

TRADE MARK L QUALITY SERVICE

PAPER BOX BOARDS
— FOR —
Folding Boxes, Set Up Boxes, Paper Cans, Shipping Containers, Etc.

Plain Strawboard	Solid Manila Tag Board
News Lined Strawboard	Brown Jute Box Board
Book Lined Strawboard	Oak Grained Jute Box Board
Plain and Lined Chip Board	Marble Grained Jute Box Board
Single and Double Manila Lined News and Chip Board	Pasted Container Board
	Bristol Ticket Board
	Diamond Wall Board
Patent Coated Folding Box Board	Champion All Leather Heel Board
Clay Coated Folding Box Board	Also other standard and special grades to order

PAPER MILLS

WE have a selling capacity twice our supply, and are in the market for paper in large volume, and would like to hear from you.

Our competent selling organization has from the beginning always demanded an ever increasing supply. We are at present all sold up and looking around for more, and are now in the market for five thousand tons in several grades.

We would be glad to hear from you what tonnage you can give us during this year. Write us.

Interstate Pulp & Paper Co., Inc.
Grand Central Terminal, New York City

THE HILL CLUTCH CO

AMERICAN SYSTEM ROPE DRIVES

Horizontal Tension Carriage

Everything from a small cast iron pulley to Complete Power Transmission Machinery Equipment for

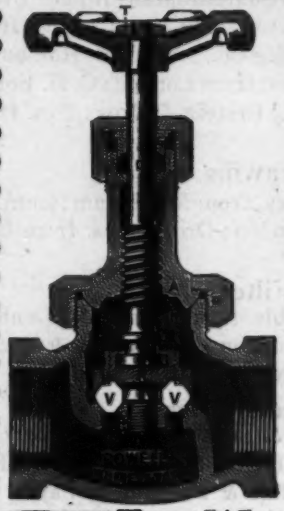
Belt Rope **DRIVE** *Gear Chain*

THE HILL CLUTCH CO.

CLEVELAND, OHIO

POWELL VALVES

(Especially The "White Star" Valve)



REVERSIBLE
REGRINDABLE
RENEWABLE
DISC

REGRINDABLE—
When the disc or seat shows signs of wear, a few rotations of the hand and a little sand and water on the disc make it tight.

REVERSIBLE—
When one side of the disc is worn out, turn it over, and after regrinding the seat you have a new valve.

RENEWABLE—
After both sides of the disc are worn out, it is only necessary to buy a new disc; you don't need a new valve.

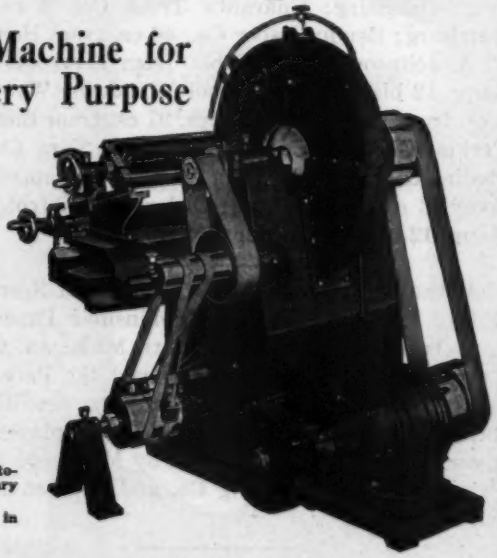
Ask your dealer for "Powell" Valves— or write us.

"White Star" Valve Booklet on request

THE WM POWELL CO.
DEPENDABLE ENGINEERING SPECIALTIES
CINCINNATI, O.

Scientific Grinding Development

A Machine for Every Purpose



Straight Wheel, Cup Wheel, Ring Wheel Grinders. Hand or automatic, wet or dry grinding. Traveling grinding wheel, stationary work, or stationary grinding wheel, traveling work.

Full automatic, adapted for every variety of grinding service in scientifically fitting knives, saws, shear blades, etc.

Get our recommendations on your requirements. General catalog free upon request.

MACHINERY COMPANY OF AMERICA

BIG RAPIDS, MICH., U. S. A.

Branch: 304 *First Ave., South, Seattle, Wash.*

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ADHESIVES
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

ACID RESISTING BRONZE
Sandusky Foundry & Machine Co., Sandusky, Ohio.
William A. Hardy & Sons, Fitchburg, Mass.

AGITATOR EQUIPMENT
The Hill Clutch Co., Cleveland, Ohio.
Moore & White Co., Philadelphia, Pa.

AIR CONDITIONING AND CONTROL APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

ALKALI
Diamond Alkali Co., Pittsburgh, Pa.

ANGLE VALVES
The Crane Company, Chicago, Ill.

ARCHITECTS
James L. Carey, 208 N. Laramie St., Chicago.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
George F. Hardy, 309 Broadway, New York City.

ASSORTING TABLES
Moore and White Co., Philadelphia, Pa.

ASH CONVEYOR SYSTEMS
American Steam Conveyor Corp., Chicago, Ill.

BALING PRESSES
Ohio Cultivator Co., Belleville, O.

BARKERS
Carthage Machine Co., Carthage, N. Y.
Fibre Making Processes, Inc., Tower Bldg., Chicago.
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.

BARK SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

BEATER BARS
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATER BED PLATES
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATER ROLL FILLING
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

BEATING, WASHING AND BLEACHING ENGINES
Dayton Beater & Hoist Co., Dayton, Ohio.
Holyoke Machine Co., Holyoke, Mass.
Noble & Wood Machine Co., Hoosick Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

BEATERS (Continuous)
Claflin Engineering Co., Lancaster, Ohio.
The Griley-Unkle Eng. Co., Ft. Wayne, Ind.
Bird Machine Co., East Walpole, Mass.

BELTING (Rubber)
United States Rubber Co., New York and Chicago

BELT CONVEYORS
The Jeffrey Mfg. Co., Columbus, O.
Robins Conveying Belt Co., New York City.

BELT DRIVES
The Hill Clutch Co., Cleveland, Ohio.
The Link Belt Co., Chicago, Ill.

BLEACHING (Propellers)
Moore and White Co., Philadelphia, Pa.

BLANKETS
Frank F. Alt., 421 Columbia St., La Fayette, Ind.

BLOWERS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

BOARD MACHINES
Beloit Iron Works, Beloit, Wis.
Valley Iron Works, Appleton, Wis.
Grasselli Chemical Co., Cleveland, Ohio.
A. Klipstein & Co., 644 to 652 Greenwich St., New York City.

DYNAMOS
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

BOARDS (Straw)
The C. L. La Boiteaux Co., Cincinnati, O.

BOILERS
J. F. Davis, Chicago.

BOILER FEEDER
The Farnsworth Co., Conshohocken, Pa.

BOILER SETTINGS
McLeod & Henry Co., Troy, N. Y.

BRASS TUBES
Wheeler Condenser & Engineering Co., Carteret, N. J.

BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.

BROKERS & FORWARDING AGENTS
Parsons Trading Co., 17 Battery Place, N. Y. C.

BRIMSTONE
Union Sulphur Co., 17 Battery Place, New York City.

BRONZE CASTINGS
Eastwood Wire Mfg. Co., Columbus, O.

BRONZE JACKETS
Sandusky Foundry & Machine Co., Sandusky, Ohio.

BUNDLING SYSTEMS
Signode System, Lake St., Chicago

CALENDERS
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.

CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N.Y.

CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.

CASEIN
J. A. & W. Bird & Co., 88 Pearl St., Boston, Mass.
The Kalbfleisch Corp., 31 Union Square, N. Y. C.

CAST IRON PIPE
U. S. Cast Iron Mfg. Co., Pittsburgh, Pa.
Cast Iron Publicity Bureau, New York City.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

CAUSTIC SODA
Diamond Alkali Co., Pittsburgh, Pa.

CAUSTICIZING APPARATUS
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

CENTRIFUGAL PUMPS
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.
Wheeler Condenser & Engineering Co., Carteret, N. J.

CHEMICALS
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
The Grasselli Chemical Co., Cleveland, Ohio.
A. Klipstein & Co., 644 to 652 Greenwich St., New York City.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Mathieson Alkali Works, Inc., New York City.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

CHIP CRUSHERS
Carthage Machine Co., Carthage, N. Y.

CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.

CHIPPER AND BARKER KNIVES
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

CHIP SCREENS
Carthage Machine Co., Carthage, N. Y.

CLAYS AND FILLERS
Binney & Smith Co., 81 Fulton St., N. Y. C.
J. A. & W. Bird & Co., 88 Pearl St., Boston, Mass.
Daniel M. Hicks, 200 Fifth Ave., New York City.
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
English China Clays Sales Corp., 33 West 42nd St., New York City.
International Pulp Co., 41 Park Row, N. Y. C.
Miner-Edgar Co., 110 William St., N. Y. C.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
R. T. Vanderbilt Co., 50 E. 42nd St., New York City.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

COAL BUNKERS
The Brownhoist Co., Cleveland, Ohio.
The Jeffrey Mfg. Co., Columbus, O.

COAL & ASH HANDLING SYSTEMS
R. H. Beaumont Co., 394 Arch St., Philadelphia, Pa.
Godfrey Conveyor Co., 119 13th St., Elkhart, Ind.
The Jeffrey Mfg. Co., Columbus, O.

COATED PAPERS
Bardeen-Paper Co., Otsego, Mich.
Bermingham & Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.

CONDENSING EQUIPMENT
Wheeler Condensing & Engineering Co., Carteret, N. J.

CONSTRUCTION (Building)
The Aladdin Co., Bay City, Mich.

CONSULTING ENGINEERS
James L. Carey, 208 N. Laramie St., Chicago, Ill.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
George F. Hardy, 309 Broadway, New York City.

CONSULTING ENGINEERS (Power)
J. P. Carrigan Engineering Co., 504 Cunard Bldg., Chicago.

CONVEYORS
Godfrey Conveyor Co., 119 13th St., Elkhart, Ind.
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Portable Machine Co., Passaic, N. J.
Robins Conveying Belt Co., New York City.

COOLING TOWERS
Wheeler Condenser & Engineering Co., Carteret, N. J.

COPPER TUBES
Wheeler Condenser & Engineering Co., Carteret, N. J.

CRANES
The Brownhoist Co., Cleveland, Ohio.
John F. Byers Co., Ravenna, Ohio.
Northern Engineering Works, Detroit, Mich.
The Chisholm-Moore Mfg. Co., Cleveland, O.
The Link Belt Co., Chicago, Ill.

CRUSHERS (Coal)
The Jeffrey Mfg. Co., Columbus, O.

CYLINDER MOLDS
Appleton Wire Works, Appleton, Wis.
Beloit Iron Works, Beloit, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Glens Falls Machine Works, Glens Falls, N. Y.
The Lindsay Wire Weaving Co., Cleveland, O.
Joseph O'Neill Wire Works, Southport, Conn.
The W. S. Tyler Co., Cleveland, Ohio.

DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Cheney Bigelow Wire Works, Springfield, Ohio.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, Ohio.
The W. S. Tyler Co., Cleveland, Ohio.

DECKEL FRAME SUPPORTS
Husband & Nash, Menasha, Wis.

DRUM WINDERS
Beloit Iron Works, Beloit, Wis.
Ticonderoga Machine Co., Ticonderoga, N. Y.

DRYER FELTS
Albany Felt Co., Albany, N. Y.
Appleton Woolen Co., Appleton, Wis.
F. C. Huyck & Sons.
Shuler and Benninghofen, Hamilton, Ohio.

DYESTUFFS
Binney & Smith, 81-83 Fulton St., N. Y. City.
E. I. Du Pont de Nemours & Co., Wilmington, Del
National Aniline & Chem. Co., 21 Burling Slip, New York City.

The "SIMS" Open Feed WATER HEATER, FILTER & PURIFIER

WHEN you buy a water heater, or anything else for that matter, you do not actually buy a water heater, but what it will do.

"SIMS" Open Feed Water Heater, Filter and Purifier is the product of Modern Engineering Science and has met the demand for greater efficiency.

OPEN FEED construction is the most simple and effective principle of feed water heating and has less maintenance troubles and operating costs than any other type.

WATER HEATER feeds your boilers with hot water, reduces the strain from contraction and expansion due to feeding cold water and effects a saving of approximately 14.5% in fuel.

FILTER and PURIFIER the feed water in a filtering chamber containing hard coke of suitable size as the filtering medium.

Water containing earthy matter and carbonate of lime when heated close to the boiling point is thrown out of solution into suspension and is removed by the filter.

Is installed you GET the service you bought

Ask us about the "Sims" feed-water heaters.

THE SIMS COMPANY

"We Keep Others in Hot Water."

ERIE PENNA.

THE SCOOP CONVEYOR
OVER 2000 IN USE
SAVES TIME AND LABOR — ENABLES MEN TO WORK EFFICIENTLY IN UNLOADING OR LOADING CARS OR TRUCKS. REPLACES FROM 6 TO 12 MEN
Keeps Equipment Moving
Saves Car Demurrage
WRITE FOR LITERATURE
PORTABLE MACHINERY CO.
PASSAIC, N.J.
R.S.P.
880

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

DUST COLLECTING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

ELECTRIC HOISTS
John F. Byers Machine Co., Ravenna, Ohio.
Link-Belt Co., Chicago, Ill.
Northern Engineering Co., Detroit, Mich.

ELECTRIC MACHINERY
Westinghouse Elec. & Mfg. Co. East Pittsburgh, Pa.

ELEVATORS
The Jeffrey Mfg. Co., Columbus, O.

ELEVATORS (Portable)
The Jeffrey Mfg. Co., Columbus, O.

ENGINES
Ball Engine Co., Erie, Pa.
The Brownell Co., Dayton, O.
Chandler and Taylor, Indianapolis, Ind.

ENGINEERS
James L. Carey, 208 North Laramie St., Chicago, Ill.
John F. Carrigan, Chicago, Ill.
George F. Hardy, 309 Brodway, New York City.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
Stebbins Engineering & Mfg. Co., Watertown, N. Y.

ENGINEERS (Testing)
Widney Test Laboratories, Chicago, Ill.

EVAPORATORS:
Buffalo Foundry & Machine Co., Buffalo, N. Y.
Charles Ordway, 25 Church St., N. Y. City.
Swenson Evaporator Co., Chicago, Ill.
Wheeler Condenser & Engineering Co., Carteret, N. J.
Zaremba Co., Buffalo, N. Y.

EXHAUSTERS
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

FANS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

FELTS AND JACKETS
Albany Felt Co., Albany, N. Y.
Appleton Woolen Co., Appleton, Wis.
F. C. Huyck & Sons, Albany, N. Y.
Lockport Felt Co., Newfane, N. Y.
Shuler and Benninghofen, Hamilton, Ohio.

FELT AND WIRE GUIDES
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.

FIBROUS PEARL FILLER
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

FILTER (Continuous Suction)
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

FILTERS (Pressure and Gravity)
Graver Corporation, East Chicago, Ind.
Hungerford & Terry, Inc., Philadelphia, Pa.

FIRE BRICK
Oliver Bros., 97 Warren St., New York City.

FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, Ohio.
Joseph O'Neill Wire Works, Southport, Conn.
The W. S. Tyler Co., Cleveland, Ohio.

FRICTION CLUTCHES
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.

FURNACE ARCHES
McLeod & Henry Co., Troy, N. Y.

FUSES
Economy Fuse & Mfg. Co., Kinzie and Orleans Sts., Chicago, Ill.

GEARS
The Hill Clutch Co., Cleveland, Ohio.

GLUES
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

GRINDERS
Glens Falls Machine Works, Glens Falls, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Valley Iron Works, Appleton, Wis.

HEATERS (Feed Water)
Graver Corporation, East Chicago, Ind.
The Sims Co., Erie, Pa.
Wheeler Condenser & Engineering Co., Carteret, N. J.

HOISTING AND CONVEYING SYSTEMS
John F. Byers Machine Co., Ravenna, Ohio.
The Chisholm-Moore Mfg. Co., Cleveland, Ohio.
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Northern Engineering Co., Detroit, Mich.
Robins Conveying Belt Co., New York City.

HOSE
United States Rubber Co., Chicago, Ill.

HYDRAULIC TURBINES
Holyoke Machine Co., Holyoke, Mass.
James Leffel and Co., Springfield, Ohio.
S. Morgan Smith Co., York, Pa.

INSTRUMENTS (Testing)
Widney Test Laboratories, Chicago, Ill.

IRON CASTINGS
Beloit Iron Works, Beloit, Wis.
Valley Iron Works Co., Appleton, Wis.

JORDAN FILLINGS
J. W. Bolton & Sons, Inc., Lawrence, Mass.

KNIVES
E. C. Atkins & Co., Indianapolis, Ind.
John W. Bolton & Sons, Inc., Lawrence, Mass.
Simonds Manufacturing Co., Fitchburg, Mass.

LAYBOYS
Moore and White Co., Philadelphia, Pa.

KNIFE GRINDING MACHINERY
Machinery Co. of America, Big Rapids, Mich.

LIGHTING EQUIPMENT
Benjamin Electric Co., Chicago, Ill.

LINE SHAFT BEARINGS
The Hill Clutch Co., Cleveland, Ohio.

MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.
Valley Iron Works, Appleton, Wis.

MECHANICAL DRAFT APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

MECHANICAL PULP
J. Andersen & Co., 21 E. 40th St., New York City.

MECHANICAL STOKERS
Sanford Riley Stoker Co., Worcester, Mass.

METERS (Gasoline)
Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

MILL ARCHITECTS
Stebbins Engineering & Mfg. Co., Watertown, N. Y.

MOISTURE TESTER
Williams Apparatus Co., Watertown, N. Y.

MOTORS
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

OIL FILTRATIONS & CIRCULATING SYSTEMS
Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

OIL HANDLING AND STORING EQUIPMENT
The Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

PAINTS
Cheesman-Elliot Co., Inc., Brooklyn, N. Y.
Detroit Graphite Co., Detroit, Mich.
The Tropical Paint & Oil Co., Cleveland, O.

PAPER BOARDS
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.
Strehl Otens Co., Inc., New York-Chicago.

PAPER CUTTERS & SLITTERS
Beloit Iron Works, Beloit, Wis.
Hamblet Machine Co., Lawrence, Mass.

PAPER DISTRIBUTORS
Bermingham and Prosser, Chicago, Ill.
H. G. Craig & Co., New York City.
Berton C. Hill Co., New York City.
Maurice O'Meara, New York City.
Seaman Paper Co., Chicago, Ill.

PAPER EXPORTERS AND IMPORTERS
Gatti-McQuade Co., 200 Fifth Ave., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Main Paper Stock Co., 29-31 Peck Slip, New York City.
New York Overseas Co., 17 Battery Place, New York City.
Interstate Pulp and Paper Co., Grand Central Bldg., New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.
Parsons Trading Co., 17 Battery Place, N. Y. C.

PAPER MACHINES
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, O.

PAPER MANUFACTURERS
American Writing Paper Co., Holyoke, Mass.
Bardeen Paper Co., Otsego, Mich.
Eastern Manufacturing Co., 501 Fifth Ave., N. Y. City.
Hammermill Paper Co., Erie, Pa.
Lincoln Paper Mills, Elkhart, Ind.
Marathon Paper Co., Rothschild, Wis.
Munising Paper Co., Munising, Mich.
Northern Paper Mills, Green Bay, Wis.
Oxford Paper Co., 200 Fifth Ave., N. Y. City.
State Pulp & Paper Co., New York City.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wolverine Paper Co., Otsego, Mich.

PAPER MANUFACTURERS' SUPPLIES
J. Andersen & Co., 21 East 40th St., New York City.
The Robert Andrews Co., 115-117 Franklin St., New York City.
Vito G. Cantasano & Bros., 185 South St., New York City.
Craig-Becker Co., 52 Vanderbilt Ave., N. Y. City.
Diamond Alkali Co., Pittsburgh, Pa.
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Francis Hughes Co., 21st St. and Loomis Ave., Chicago.
Invincible Paper & Pulp Corporation, 135 Broadway, N. Y. City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Martin Spinelli, 132 Nassau St., New York City.
Main Paper Stock Co., 25 Spruce St., New York City.
Mendelson Bros. Paper Stock Co., 910 Michigan Ave., Chicago.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Paper Makers' Chemical Co., St. Austell, England.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
A. Salomon, Inc., New York City.
Salomon Bros. & Co., 200 Fifth Ave., N. Y. C.
Spinelli, Martin, Brooklyn, N. Y.
Steele By-Products Co., Chicago.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

PAPER MILL BROKERS
Gibbs-Brower Co., 261 Broadway, N. Y. C.

PAPER STOCK CUTTERS
Taylor, Stiles & Co., Riegelsville, N. J.

PAPER AND PULP MILL MACHINERY
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, O.
The Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.

PAPER TESTERS
Widney Test Laboratories, Chicago, Ill.

PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Sutherland Paper Co., Kalamazoo, Mich.

PIPE BENDING
American Pipe Bending Co., Boston, Mass.

PIPING EQUIPMENT
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.

PIPING SYSTEMS INSTALLED
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.

"Boys, This Will Pay Our Salaries!" This is what the General Manager of one of the largest paper mills in this country said to the Superintendent and Boss Machine-tender after installing a

WILLIAMS STANDARD PAPER MOISTURE TESTER

Was He Right?

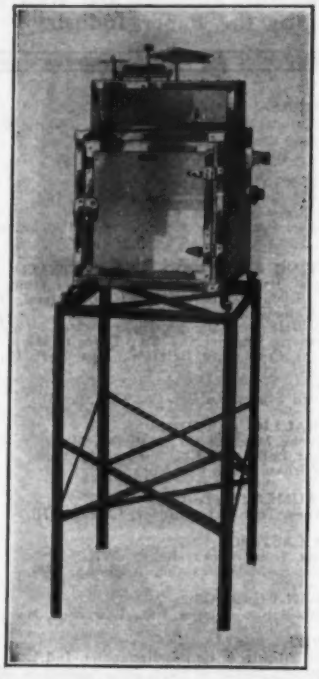
Figure it out. You know your production. If you are shipping out your paper 2 or 3 per cent too dry, figure your loss in tonnage to which you are entitled. (Tests at one mill showed a variation of 8% in moisture content.)

Other losses are:

Fuel loss in over-drying.

Production loss due to more breaks in over-dry paper.

Is over-dry paper more satisfactory to your customer? NO.



Description

A compact apparatus which will give you in 10 minutes the exact moisture of content of your paper as it comes off the machine.

Accurate to .1 of 1%.

No special skill required to operate. Anyone who can weigh roll paper or get the base weight of a sample can operate it.

Double walled electric oven with thermostat control, accurate scales, with beam graduated to read % of moisture directly. No calculation required.

Tests all kinds of paper from tissue to board.

WILLIAMS APPARATUS CO.

Send today for descriptive matter

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Every Paper Mill Can Profitably Use One or More of These Outfits. In Some Mills, One Will PAY FOR ITSELF IN ONE DAY.

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VOORHEES RUBBER MFG CO

VOORHEES SENSATION

Combines the outstanding features of best available Rubber Belting with widest range of Leather qualifications—

AND MORE—

It multiplies the best features of both
By extraordinary tensile strength
An incomparable pulley-grip
An absence of stretch
Defiance of moisture and running heat
Stability of piles which retain unusual
Flexing Properties
After all, "SENSATION" will be YOUR Belt.
A sample will SHOW more than we can TELL here.

Sole Manufacturers

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Home of "Rub-Steel"—"The Valve with a Backbone" ***New York Office, 30 Reade Street***

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

PLUG MACHINES
Carthage Machine Co., Carthage, N. Y.

PNEUMATIC CHIP HANDLING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

POWER INSTRUMENTS
The Manning Gauge Co., Inc., 77 Traverse St., Boston, Mass.

POWER TRANSMISSION
Dodge Sales & Engineering Co., Mishawaka, Ind.
Link-Belt Co., Chicago, Ill.
The Hill Clutch Co., Cleveland, Ohio.
Valley Iron Works, Williamsport, Pa.

PUBLISHERS
The Chemical Catalog Co., New York City.
T. A. P. P. I., Room 1102, 18 E. 42nd St., New York City.

PULP (Chemical)
J. Andersen & Co., 21 East 40th St., New York City.
Craig-Becker Co., 52 Vanderbilt Ave., N. Y. City.
M. Gottesman & Co., 18 E. 41st St., New York City.
Daniel M. Hicks, 200 Fifth Ave., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Price & Pierce, Ltd., 30 East 42nd St., New York City.
The Pulp & Paper Trading Co., 21 East 40th St., New York City.
Scandinavian-American Trading Co., 50 East 42d St., New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.

PULP EXTRACTORS
The Griley-Unkle Eng. Co., Ft. Wayne, Ind.

PULP AND PAPER MACHINERY
Beloit Iron Works, Beloit, Wis.
Bird Machine Co., East Walpole, Mass.
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Co., Glens Falls, N. Y.
Green Bay Foundry & Mach. Works, Green Bay, Wis.
Moore & White Co., Philadelphia, Pa.
Union Iron Works, Bangor, Me.
Valley Iron Works, Appleton, Wis.

PULP GRINDERS
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Union Iron Works, Bangor, Me.

PULP MILL BROKERS
Gibbs-Brower Co., 261 Broadway, N. Y. C.

PULP LAP SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

PULP SHREDDERS
Carthage Machine Co., Carthage, N. Y.

PULP THICKENERS
Green Bay Foundry & Mach. Works, Green Bay, Wis.

PUMPS (Stock)
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Co., Glens Falls, N. Y.

PUMPS (Centrifugal)
Wheeler Condenser & Engineering Co., Carteret, N. J.

PUMPS (Deep Well)
Gregg Pump Co., Kansas City, Mo.

PUMPS (Gasoline)
Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

PUMPS (Vacuum)
American Steam Pump Co., Battle Creek, Mich.
Buffalo Foundry and Machine Co., Buffalo, N. Y.
Dean Bros., Indianapolis, Ind.
Wheeler Condenser & Engineering Co., Carteret, N. J.

RAG AND PAPER DUSTERS
Holyoke Machine Co., Holyoke, Mass.

RAG CUTTERS
B. F. Perkins & Son, Inc., Holyoke, Mass.

REFLECTORS
Benjamin Electric Co., Chicago, Ill.

ROTARY VACUUM PUMPS
Sandusky Foundry & Machine Co., Sandusky, O.

RUBBER ROLLS
United States Rubber Co., New York and Chicago

ROTARY SCREEN
Bird Machine Co., East Walpole, Mass.

SAVE-ALLS
Bird Machine Co., East Walpole, Mass.
Glens Falls Machine Co., Glens Falls, N. Y.

SAWS
E. C. Atkins & Co, Indianapolis, Ind.
Simonds Manufacturing Co., Fitchburg, Mass.

SCREENS
Bird Machine Co., East Walpole, Mass.
Shartle Bros. Mach. Co., Middletown, O.
Union Iron Works, Bangor, Me.

SCREEN PLATES
Central Mfg. Co., Kalamazoo, Mich.
William A. Hardy & Sons, Fitchburg, Mass.

SCREEN DIAPHRAGMS
United States Rubber Co., Chicago, Ill.

SHAKE (Fourdrinier Cushion)
Wm. C. Nash, Neenah, Wis.

SHOWER PIPES
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SILENT CHAIN DRIVES
The Link Belt Co., Chicago, Ill.

SIZING SYSTEMS
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Process Engineers, New York City.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

SLITTING AND REWINDING MACHINERY
Beloit Iron Works, Beloit, Wis.
Cameron Machine Co., Poplar St., Brooklyn, N. Y.
Hamblet Machine Co., Lawrence, Mass.
Samuel M. Langston Co., Camden, N. J.

SOOT BLOWERS
Diamond Power Specialty Co., Detroit, Mich.

SOAPSTONE
Alberene Stone Co., 223 E. 23rd St., New York City.

SODA ASH
Diamond Alkali Co., Pittsburgh, Pa.

SPEED CHANGES
Moore and White Co., Philadelphia, Pa.

STEAM JET CONVEYORS
American Steam Conveyor Corp., Chicago, Ill.

STEAM TRAPS
The Ellis Drier Co., 332 S. La Salle St., Chicago.

STOCK CIRCULATING SYSTEM
Claflin Engineering Co., Lancaster, Ohio.
Ticonderoga Machine Works, Ticonderoga, N.Y.

STOCK PUMPS
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.

SUCTION ROLLS
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SULPHITE MACHINERY
Stebbins Engineering Co., Watertown, N. Y.

SULPHUR
Union Sulphur Co., 17 Battery Place, New York City.

SULPHUR BURNERS
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

TANKS (Oil Storage)
Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.
Graver Corporation, East Chicago, Ind.

TANKS (Steel)
Graver Corporation, East Chicago, Ind.

TANKS (Welded)
Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

TANKS (Water Storage)
Graver Corporation, East Chicago, Ind.

TESTERS (Moisture)
Williams Apparatus Co., Watertown, N. Y.

TUBING
Wheeler Condensing & Engineering Co., Carteret, N. J.

TURBINES (Hydraulic)
James Leffel and Co., Springfield, Ohio.
S. Morgan Smith Co., York, Pa.

VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.

VALVES
Carthage Machine Co., Carthage, N. Y.
The Crane Co., Chicago, Ill.
G. M. Davis Regulator Co., 414 Milwaukee Ave., Chicago, Ill.
The Wm. Powell Co., Cincinnati, Ohio.
Voorhees Rubber Mfg. Co., Jersey City, N. J.

VALVES (Strainer)
Bird Machine Co., East Walpole, Mass.

VAPOR ABSORPTION SYSTEMS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

VARIABLE SPEED ENGINES
Ball Engine Co., Erie, Pa.
The Brownell Co., Dayton, Ohio.
Chandler and Taylor, Indianapolis, Ind.

VENTILATING SYSTEMS
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Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Perkins & Son, Inc., Holyoke, Mass.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

WASHER WIRES
The W. S. Tyler Co., Cleveland, Ohio.

WASTE PAPER STOCK
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Main Paper Stock Co., 23-31 Peck Slip, New York City.
P. G. Marquardt, Inc., 345 Broadway, N. Y. C.
Martin Spinelli, 132 Nassau St., New York City.
Mendelson Bros. Paper Stock Co., 910 S. Michigan Blvd., Chicago, Ill.
Salomon Bros. & Co., 200 Fifth Ave., N. Y. C.

WATCHMAN'S CLOCKS
Chicago Watchman's Clock Works, 1526 Wabash Ave., Chicago.

WATER FILTER
Glens Falls Machine Co, Glens Falls, N. Y.
Green Bay Foundry & Mach. Works, Green Bay, Wis.
Hungerford & Terry, Inc., Philadelphia, Pa.

WATER HEATERS:
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The Sims Co., Erie, Pa.

WATERPROOF LINING
The National Waterproofing Co., Philadelphia, Pa.

WATER-SOFTENING AND PURIFYING SYSTEMS
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Wm. B. Scaife and Sons Co., Oakmont, Pa.

WATER WHEELS
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.
S. Morgan Smith Co., York, Pa.

WELDING & CUTTING EQUIPMENT
The Imperial Brass Mfg. Co., 516 So. Racine Ave., Chicago.

WET MACHINES
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Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

WOOD CHIP SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

WOOD PIPE
The Michigan Pipe Co., Dept. 17, Bay City, Mich.
A. Wyckoff & Son Co., Elmira, N. Y.

WOOD SPLITTERS
Carthage Machine Co., Carthage, N. Y.

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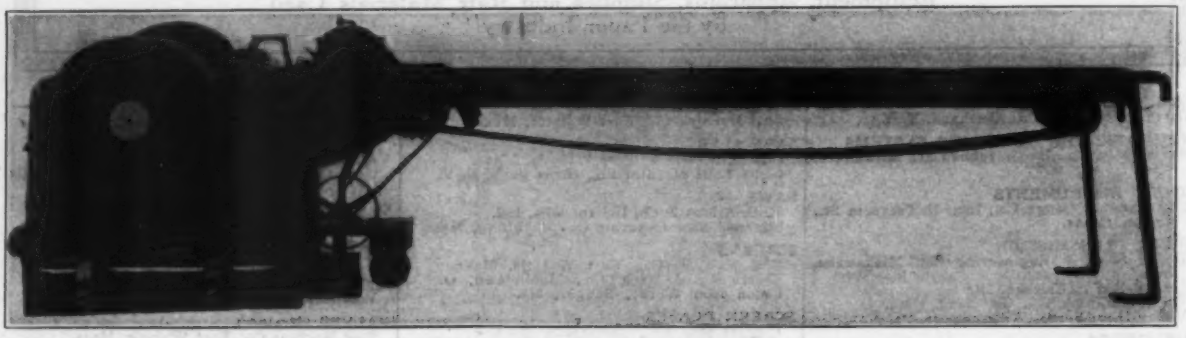

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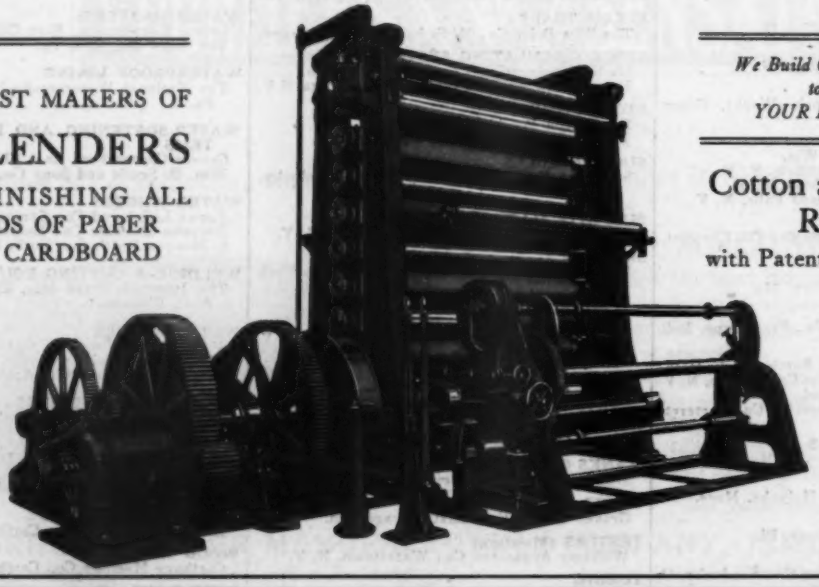

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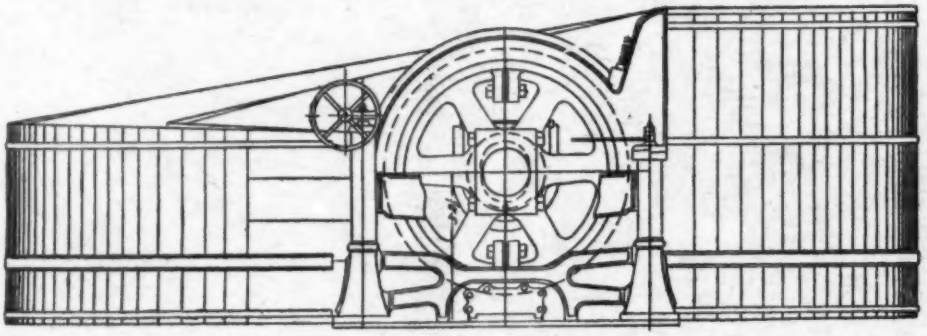

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